pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

**Southcentral Regional Office**
**CLEAN WATER PROGRAM**

# NPDES PERMIT FACT SHEET
# INDIVIDUAL SEWAGE

| | | | |
|---|---|---|---|
| Application Type | **Renewal** | Application No. | **PA0033553** |
| Facility Type | **Non-Municipal** | APS ID | **275868** |
| Major / Minor | **Minor** | Authorization ID | **1409209** |

## Applicant and Facility Information

| | | | |
|---|---|---|---|
| Applicant Name | **Gehmans Mennonite School** | Facility Name | **Gehmans Mennonite School** |
| Applicant Address | 650 Gehman School Road | Facility Address | 650 Gehman School Road |
| | Denver, PA 17517-8921 | | Denver, PA 17517-8921 |
| Applicant Contact | Barry Wenger | Facility Contact | Barry Wenger |
| Applicant Phone | (717) 484-4222 | Facility Phone | (717) 484-4222 |
| Client ID | 44925 | Site ID | 271494 |
| Ch 94 Load Status | Not Overloaded | Municipality | Brecknock Township |
| Connection Status | No Limitations | County | Lancaster |
| Date Application Received | September 5, 2022 | EPA Waived? | Yes |
| Date Application Accepted | September 7, 2022 | If No, Reason | |

Purpose of Application: NPDES Renewal.

## Summary of Review

Gehmans Mennonite School has applied to the Pennsylvania Department of Environmental Protection (DEP) for reissuance of its National Pollutant Discharge Elimination System (NPDES) permit. The existing permit was issued on March 29, 2018 and became effective on April 1, 2018, authorizing discharge of treated sewage from the facility into Little Muddy Creek. The existing permit expiration date is March 31, 2023.

Changes in this renewal: Ammonia-Nitrogen and E. Coli monitoring has been added to the permit.

Sludge use and disposal description and location(s): Sludge holding tank with offsite disposal

Supplemental information for this facility is provided at the end of this fact sheet.

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 | | Benjamin R. Lockwood<br>Benjamin R. Lockwood / Environmental Engineering Specialist | February 8, 2023 |
| X | | Daniel W. Martin<br>Daniel W. Martin, P.E. / Environmental Engineer Manager | February 22, 2023 |

**Discharge, Receiving Waters and Water Supply Information**

| | | | |
|---|---|---|---|
| Outfall No. | 001 | Design Flow (MGD) | .0014 |
| Latitude | 40º 13' 18.35" | Longitude | 76º 4' 1.57" |
| Quad Name | Terre Hill | Quad Code | 1737 |
| Wastewater Description: | Sewage Effluent | | |

| | | | |
|---|---|---|---|
| Receiving Waters | Little Muddy Creek (WWF, MF) | Stream Code | 7765 |
| NHD Com ID | 57461445 | RMI | 4.85 |
| Drainage Area | 10.4 $mi^2$ | Yield ($cfs/mi^2$) | 0.069 |
| $Q_{7-10}$ Flow (cfs) | 0.721 | $Q_{7-10}$ Basis | USGS PA StreamStats |
| Elevation (ft) | 426 | Slope (ft/ft) | |
| Watershed No. | 7-J | Chapter 93 Class. | WWF, MF |
| Existing Use | N/A | Existing Use Qualifier | N/A |
| Exceptions to Use | N/A | Exceptions to Criteria | N/A |
| Assessment Status | Impaired | | |
| Cause(s) of Impairment | Pathogens, Habitat Alterations | | |
| Source(s) of Impairment | Source Unknown, Habitat Modification – Other than Hydromodification | | |
| TMDL Status | N/A | Name | N/A |

| | | | |
|---|---|---|---|
| Nearest Downstream Public Water Supply Intake | Lancaster City Water Bureau | | |
| PWS Waters | Conestoga River | Flow at Intake (cfs) | |
| PWS RMI | | Distance from Outfall (mi) | 27.2 |

Changes Since Last Permit Issuance: The USGS PA StreamStats is showing a drainage area of 10.4 $mi^2$ and a $Q_{7-10}$ flow of 0.721 $ft^3/s$ at the point of discharge.

Other Comments: None

| Treatment Facility Summary | | | | |
|---|---|---|---|---|
| **Waste Type** | **Degree of Treatment** | **Process Type** | **Disinfection** | **Avg Annual Flow (MGD)** |
| Sewage | Secondary | Septic Tank with Sand Filter Treatment | Calcium Hypochlorite | 0.0014 |
| | | | | |
| | | | | |
| **Hydraulic Capacity (MGD)** | **Organic Capacity (lbs/day)** | **Load Status** | **Biosolids Treatment** | **Biosolids Use/Disposal** |
| 0.0014 | | Not Overloaded | Holding Tank | Other WWTP |

Changes Since Last Permit Issuance: None

Other Comments: The treatment process is as follows:

Septic Tank – Dosing Tank – Sand Filter – Chlorine Contact Tank – Dechlorination Tank – Outfall 001 to Little Muddy Creek

| Compliance History | |
|---|---|
| | |
| **Summary of DMRs:** | A summary of the past 12-month DMR effluent data is present on the next page of this fact sheet. |
| **Summary of Inspections:** | 12/18/2018: A routine inspection was conducted. Effluent appeared mostly clear. No issues were observed at the outfall. No other issues were noted at the WWTP. |

Other Comments: There are currently no open violations associated with the permittee or the facility.

## Compliance History

**DMR Data for Outfall 001 (from January 1, 2022 to December 31, 2022)**

| Parameter | DEC-22 | NOV-22 | OCT-22 | SEP-22 | AUG-22 | JUL-22 | JUN-22 | MAY-22 | APR-22 | MAR-22 | FEB-22 | JAN-22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow (MGD) Average Monthly | 0.000223 | 0.00029 | 0.000323 | 0.00033 | 0.000182 | | | 0.000364 | 0.000392 | 0.000369 | 0.000305 | 0.001072 |
| Flow (MGD) Daily Maximum | 0.000379 | 0.00032 4 | 0.00041 | 0.000426 | 0.00026 | | | 0.000726 | 0.000531 | 0.000477 | 0.000346 | 0.001474 |
| pH (S.U.) Minimum | 6.83 | 7.12 | 7.49 | 7.51 | 7.63 | | | 7.29 | 7.19 | 7.68 | 7.31 | 7.66 |
| pH (S.U.) Maximum | 7.63 | 8.07 | 8.19 | 8.09 | 7.98 | | | 7.85 | 7.48 | 8.14 | 8.0 | 8.05 |
| TRC (mg/L) Average Monthly | 0.10 | 0.2 | 0.2 | 0.2 | 0.1 | | | 0.04 | 0.02 | 0.1 | 0.1 | 0.1 |
| TRC (mg/L) Instantaneous Maximum | 0.22 | 0.62 | 0.4 | 0.3 | 0.2 | | | 0.09 | 0.04 | 0.4 | 0.4 | 0.3 |
| CBOD5 (mg/L) Average Monthly | 8.0 | 2.4 | 4.0 | 6.5 | 4.0 | | | 2.0 | 6.0 | 5.0 | 11.0 | 2 |
| TSS (mg/L) Average Monthly | 2.0 | 3.0 | 20 | 27.0 | 7.0 | | | 5.0 | 7.0 | 13.0 | 4.0 | 7 |
| Fecal Coliform (CFU/100 ml) Geometric Mean | 1.0 | 1.0 | 1.0 | 39.0 | 16.0 | | | 1.0 | 60.0 | 4.0 | 1.0 | 1.0 |

## Existing Effluent Limitations and Monitoring Requirements

The table below summarizes effluent limits and monitoring requirements implemented in the existing NPDES permit.

**Outfall 001**

| Parameter | Effluent Limitations | | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|---|
| | Mass Units (lbs/day) (1) | | Concentrations (mg/L) | | | | Minimum (2) Measurement Frequency | Required Sample Type |
| | Average Monthly | Daily Maximum | Minimum | Average Monthly | Maximum | Instant. Maximum | | |
| Flow (MGD) | Report | Report | XXX | XXX | XXX | XXX | 1/week | Measured |
| pH (S.U.) | XXX | XXX | 6.0 | XXX | 9.0 | XXX | 1/week | Grab |
| Total Residual Chlorine (TRC) | XXX | XXX | XXX | 0.5 | XXX | 1.6 | 1/week | Grab |
| Carbonaceous Biochemical Oxygen Demand (CBOD5) | XXX | XXX | XXX | 25 | XXX | 50 | 1/month | Grab |
| Total Suspended Solids | XXX | XXX | XXX | 30 | XXX | 60 | 1/month | Grab |
| Fecal Coliform (CFU/100 ml) Oct 1 - Apr 30 | XXX | XXX | XXX | 2000 Geo Mean | XXX | 10000 | 1/month | Grab |
| Fecal Coliform (CFU/100 ml) May 1 - Sep 30 | XXX | XXX | XXX | 200 Geo Mean | XXX | 1000 | 1/month | Grab |

Compliance Sampling Location: Outfall 001

## Development of Effluent Limitations

**Outfall No.** 001 **Design Flow (MGD)** .0014
**Latitude** 40º 13' 18.35" **Longitude** 76º 4' 1.57"
**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) |

### Water Quality-Based Limitations

$CBOD_5$, $NH_3$-N

Pursuant to 40 CFR § 122.44(d)(1)(i), more stringent requirements should be considered when pollutants are discharged at the levels which have the reasonable potential to cause or contribute to excursions above water quality standards.

WQM 7.0 ver. 1.1b is a water quality model designed to assist DEP in determining appropriate water quality based effluent limits (WQBELs) for carbonaceous biochemical oxygen demand ($CBOD_5$), ammonia ($NH_3$-N) and dissolved oxygen (D.O.). DEP's Technical Guidance No. 391-2000-007 provides the technical methods contained in WQM 7.0 for determining wasteload allocations and for determining recommended NPDES effluent limits for point source discharges. The model was utilized for this permit renewal. The model output indicated a $CBOD_5$ average monthly limit of 25 mg/l, an $NH_3$-N average monthly limit of 25 mg/l, and a D.O. minimum limit of 5.0 mg/l were protective of water quality. The flow data used to run the model was acquired from USGS PA StreamStats and is included as an attachment. The $CBOD_5$ limit is the same as the limit in the existing permit, which will remain. PADEP's SOP No. BCW-PMT-033 states "for existing discharges, if WQM modeling results for summer indicates that an average monthly limit of 25 mg/l is acceptable, the application manager will generally establish a year-round monitoring requirement for ammonia-nitrogen, at a minimum." Therefore, a year-round monitoring requirement for ammonia-nitrogen has been added to the permit.

There are no industrial/commercial users contributing industrial wastewater to the system and Gehmans Mennonite School does not currently have an EPA-approved pretreatment program. Accordingly, evaluating reasonable potential of toxic pollutants is not necessary as effluent levels of toxic pollutants are expected to be insignificant.

### Additional Considerations

Chesapeake Bay Total Maximum Daily Load (TMDL)

DEP developed a strategy to comply with the EPA and Chesapeake Bay Foundation requirements by reducing point source loadings of Total Nitrogen (TN) and Total Phosphorus (TP). This strategy can be located in the *Pennsylvania Chesapeake Watershed Implementation Plan* (WIP), dated January 11, 2011. Subsequently, an update to the WIP was published as the Phase 2 WIP. As part of the Phase 2 WIP, a *Phase 2 Watershed Implementation Plan Wastewater Supplement* (Phase 2

Supplement) was developed, providing an update on TMDL implementation for point sources and DEP's current implementation strategy for wastewater. A new update to the WIP was published as the Phase 3 WIP in August 2019. As part of the Phase 3 WIP, a *Phase 3 Watershed Implementation Plan Wastewater Supplement* (Phase 3 Supplement) was developed, and was most recently revised on December 17, 2019, and is the basis for the development of any Chesapeake Bay related permit parameters. Sewage discharges have been prioritized based on their design flow to the Bay. The highest priority (Phases 1, 2, and 3) dischargers will receive annual Cap Loads based on their design flow on August 29, 2005 and concentrations of 6 mg/l TN and 0.8 mg/l TP. These limits may be achieved through a combination of treatment technology, credits, or offsets. For Phase 4 and 5 facilities, Cap Loads are not currently being implemented for renewed or amended permits for facilities that do not increase design flow.

This facility has a design flow less than 2,000 gpd. Chesapeake Bay requirements for nutrients do not include WWTPs with design flow less than 2,000 gpd, therefore, TN and TP monitoring is not required.

Fecal Coliform

PA Code § 92a.47.(a)(4) requires a monthly average limit of 200/100 mL as a geometric mean and an instantaneous maximum limit not greater than 1,000/100 mL from May through September for fecal coliform. PA Code § 92a.47.(a)(5) requires a monthly average limit of 2,000/100 mL as a geometric mean and an instantaneous maximum limit not greater than 10,000/100 mL from October through April for fecal coliform. These limits are included in the existing permit and will remain in the renewal.

E. Coli

PA Code § 92a.61 requires IMAX reporting of E. Coli. Per DEP's SOP No. BCW-PMT-033, sewage dischargers with a design flow of 0.002 – 0.05 mgd will include E. Coli monitoring with a frequency of 1/year. This parameter has been added to the renewal permit.

Total Residual Chlorine

The attached computer printout utilizes the equations and calculations as presented in the Department's May 1, 2003 Implementation Guidance for Total Residual Chlorine (TRC) (ID No. 391-2000-015) for developing chlorine limitations. The Guidance references Chapter 92, Section 92.2d (3) which establishes a standard BAT limit of 0.5 mg/l unless a facility-specific BAT has been developed. The attached printout indicates that a water quality limit of 0.5 mg/l would be needed to prevent toxicity concerns. This is the same as the existing permit limit; therefore, a TRC limit of 0.5 mg/l monthly average and 1.6 mg/l instantaneous maximum will be included in this permit.

Sampling Frequency & Sample Type

The monitoring requirements were established based on BPJ and/or Table 6-3 of DEP's Technical Guidance No. 362-0400-001.

Anti-Degradation

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

303(d) Listed Streams

The discharge is located on a stream segment that is designated on the 303(d) list as impaired. There is an aquatic life impairment due to habitat alterations from habitat modification – other than hydromodification. There is a recreational impairment due to pathogens from an unknown source. The proposed effluent limits include limits for fecal coliform.

Class A Wild Trout Fisheries

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

Anti-Backsliding

Pursuant to 40 CFR § 122.44(l)(1), all proposed permit requirements addressed in this fact sheet are at least as stringent as the requirements implemented in the existing NPDES permit unless any exceptions are addressed by DEP in this fact sheet.

## 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.

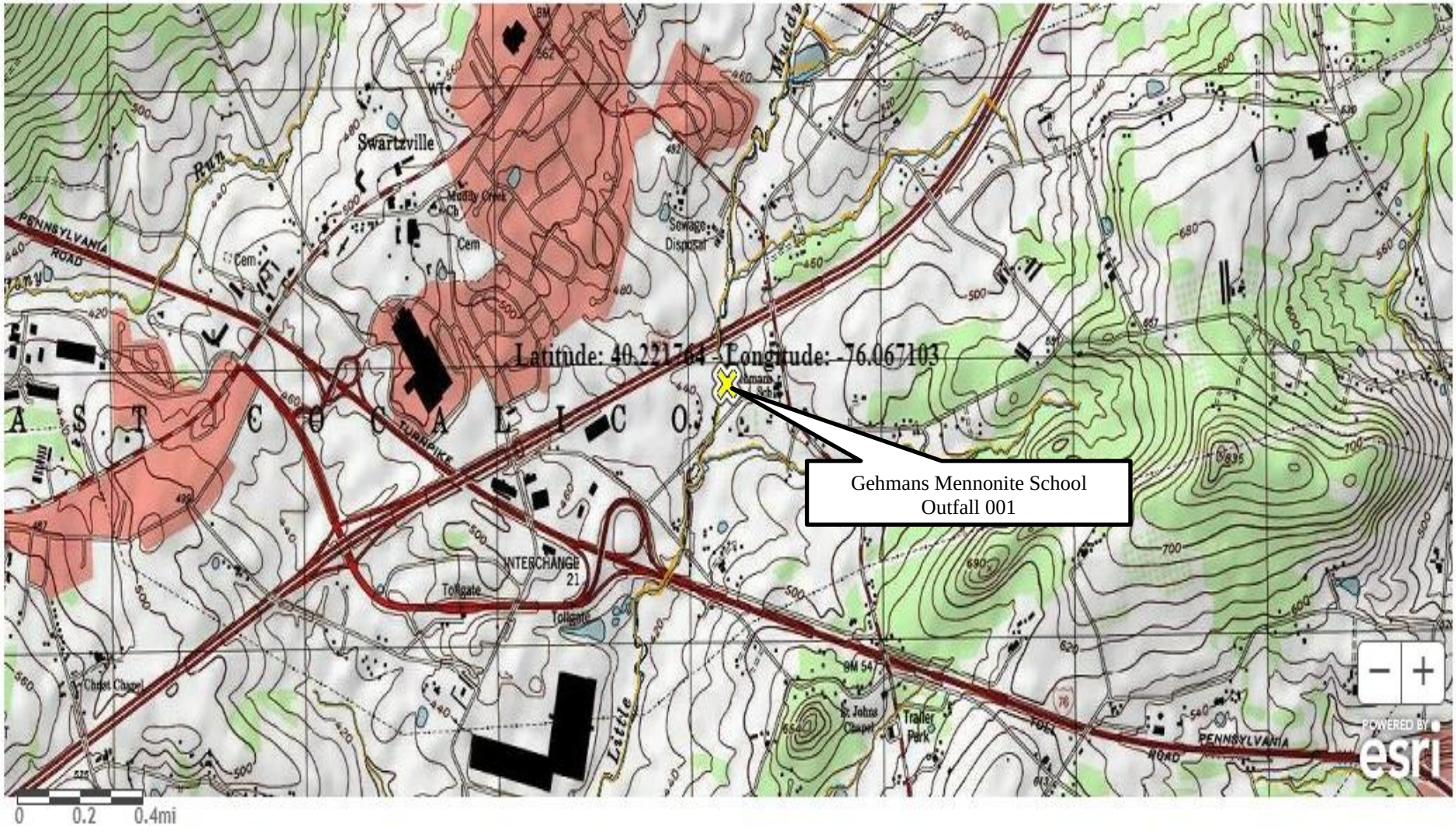
**Outfall 001, Effective Period: Permit Effective Date through Permit Expiration Date**.

| 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 | Report Daily Max | XXX | XXX | XXX | XXX | 1/week | Measured |
| pH (S.U.) | XXX | XXX | 6.0 Inst Min | XXX | XXX | 9.0 | 1/week | Grab |
| TRC | XXX | XXX | XXX | 0.5 | XXX | 1.6 | 1/week | Grab |
| CBOD5 | XXX | XXX | XXX | 25 | XXX | 50 | 1/month | Grab |
| TSS | XXX | XXX | XXX | 30 | XXX | 60 | 1/month | Grab |
| Fecal Coliform (No./100 ml) Oct 1 - Apr 30 | XXX | XXX | XXX | 2000 Geo Mean | XXX | 10000 | 1/month | Grab |
| Fecal Coliform (No./100 ml) May 1 - Sep 30 | XXX | XXX | XXX | 200 Geo Mean | XXX | 1000 | 1/month | Grab |
| E. Coli (No./100 ml) | XXX | XXX | XXX | XXX | XXX | Report | 1/year | Grab |
| Ammonia-Nitrogen | XXX | XXX | XXX | Report | XXX | XXX | 1/month | Grab |

Compliance Sampling Location: Outfall 001

Other Comments: None

| Tools and References Used to Develop Permit | |
|---|---|
| | |
| ☒ | WQM for Windows Model (see Attachment ) |
| ☐ | Toxics Management Spreadsheet (see Attachment ) |
| ☒ | TRC Model Spreadsheet (see Attachment ) |
| ☐ | Temperature Model Spreadsheet (see Attachment ) |
| ☐ | Water Quality Toxics Management Strategy, 361-0100-003, 4/06. |
| ☒ | Technical Guidance for the Development and Specification of Effluent Limitations, 362-0400-001, 10/97. |
| ☐ | Policy for Permitting Surface Water Diversions, 362-2000-003, 3/98. |
| ☐ | Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 362-2000-008, 11/96. |
| ☐ | Technology-Based Control Requirements for Water Treatment Plant Wastes, 362-2183-003, 10/97. |
| ☐ | Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 362-2183-004, 12/97. |
| ☐ | Pennsylvania CSO Policy, 385-2000-011, 9/08. |
| ☐ | Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03. |
| ☐ | Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 391-2000-002, 4/97. |
| ☒ | Determining Water Quality-Based Effluent Limits, 391-2000-003, 12/97. |
| ☐ | Implementation Guidance Design Conditions, 391-2000-006, 9/97. |
| ☒ | Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 391-2000-007, 6/2004. |
| ☐ | Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 391-2000-008, 10/1997. |
| ☐ | Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 391-2000-010, 3/99. |
| ☐ | Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 391-2000-011, 5/2004. |
| ☐ | Implementation Guidance for Section 93.7 Ammonia Criteria, 391-2000-013, 11/97. |
| ☐ | Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 391-2000-014, 4/2008. |
| ☐ | Implementation Guidance Total Residual Chlorine (TRC) Regulation, 391-2000-015, 11/1994. |
| ☐ | Implementation Guidance for Temperature Criteria, 391-2000-017, 4/09. |
| ☐ | Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 391-2000-018, 10/97. |
| ☐ | Implementation Guidance for Application of Section 93.5(e) for Potable Water Supply Protection Total Dissolved Solids, Nitrite-Nitrate, Non-Priority Pollutant Phenolics and Fluorides, 391-2000-019, 10/97. |
| ☐ | Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 391-2000-021, 3/99. |
| ☐ | Implementation Guidance for the Determination and Use of Background/Ambient Water Quality in the Determination of Wasteload Allocations and NPDES Effluent Limitations for Toxic Substances, 391-2000-022, 3/1999. |
| ☐ | Design Stream Flows, 391-2000-023, 9/98. |
| ☐ | Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 391-2000-024, 10/98. |
| ☐ | Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 391-3200-013, 6/97. |
| ☐ | Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07. |
| ☐ | SOP: BCW-PMT-033 |
| ☐ | Other: |



## Gehmans Mennonite School PA0033553 Outfall 001

**Region ID:** PA
**Workspace ID:** PA20230207125342388000
**Clicked Point (Latitude, Longitude):** 40.22173, -76.06728
**Time:** 2023-02-07 07:54:04 -0500


Collapse All

### Basin Characteristics

| Parameter Code | Parameter Description | Value | Unit |
|---|---|---|---|
| BSLOPD | Mean basin slope measured in degrees | 5.2682 | degrees |
| DRNAREA | Area that drains to a point on a stream | 10.4 | square miles |
| ROCKDEP | Depth to rock | 4.2 | feet |
| URBAN | Percentage of basin with urban development | 6.4316 | percent |

### Low-Flow Statistics

Low-Flow Statistics Parameters [99.9 Percent (10.4 square miles) Low Flow Region 1]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|---|---|---|---|---|---|
| DRNAREA | Drainage Area | 10.4 | square miles | 4.78 | 1150 |
| BSLOPD | Mean Basin Slope degrees | 5.2682 | degrees | 1.7 | 6.4 |
| ROCKDEP | Depth to Rock | 4.2 | feet | 4.13 | 5.21 |
| URBAN | Percent Urban | 6.4316 | percent | 0 | 89 |

Low-Flow Statistics Flow Report [99.9 Percent (10.4 square miles) Low Flow Region 1]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

| Statistic | Value | Unit | SE | ASEp |
|---|---|---|---|---|
| 7 Day 2 Year Low Flow | 1.62 | ft^3/s | 46 | 46 |
| 30 Day 2 Year Low Flow | 2.18 | ft^3/s | 38 | 38 |
| 7 Day 10 Year Low Flow | 0.721 | ft^3/s | 51 | 51 |
| 30 Day 10 Year Low Flow | 1.01 | ft^3/s | 46 | 46 |
| 90 Day 10 Year Low Flow | 1.6 | 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/)**

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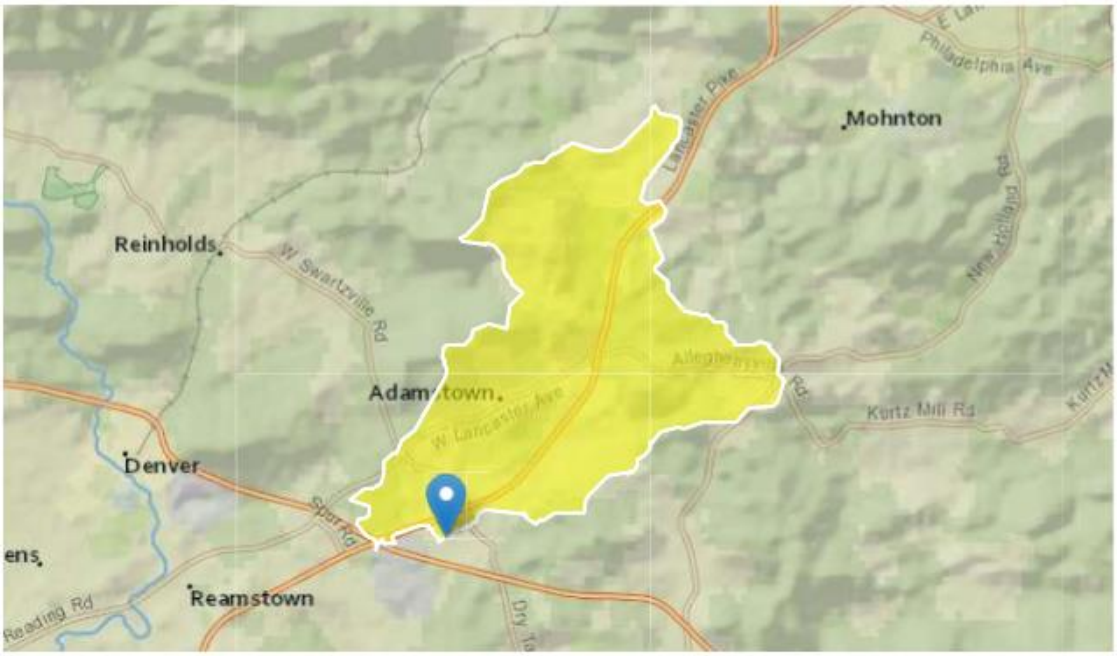
Application Version: 4.12.0
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

## Gehmans Mennonite School PA0033553 Downstream Point

**Region ID:** PA
**Workspace ID:** PA20230207134225540000
**Clicked Point (Latitude, Longitude):** 40.21926, -76.06884
**Time:** 2023-02-07 08:42:47 -0500




Collapse All

### Basin Characteristics

| Parameter Code | Parameter Description | Value | Unit |
|---|---|---|---|
| BSLOPD | Mean basin slope measured in degrees | 5.1591 | degrees |
| DRNAREA | Area that drains to a point on a stream | 10.7 | square miles |
| ROCKDEP | Depth to rock | 4.2 | feet |
| URBAN | Percentage of basin with urban development | 6.5265 | percent |

### Low-Flow Statistics

## Low-Flow Statistics Parameters [99.9 Percent (10.7 square miles) Low Flow Region 1]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|---|---|---|---|---|---|
| DRNAREA | Drainage Area | 10.7 | square miles | 4.78 | 1150 |
| BSLOPD | Mean Basin Slope degrees | 5.1591 | degrees | 1.7 | 6.4 |
| ROCKDEP | Depth to Rock | 4.2 | feet | 4.13 | 5.21 |
| URBAN | Percent Urban | 6.5265 | percent | 0 | 89 |

## Low-Flow Statistics Flow Report [99.9 Percent (10.7 square miles) Low Flow Region 1]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

| Statistic | Value | Unit | SE | ASEp |
|---|---|---|---|---|
| 7 Day 2 Year Low Flow | 1.62 | ft^3/s | 46 | 46 |
| 30 Day 2 Year Low Flow | 2.2 | ft^3/s | 38 | 38 |
| 7 Day 10 Year Low Flow | 0.72 | ft^3/s | 51 | 51 |
| 30 Day 10 Year Low Flow | 1.02 | ft^3/s | 46 | 46 |
| 90 Day 10 Year Low Flow | 1.62 | 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/)**

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Application Version: 4.12.0
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

## 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 |
|---|---|---|---|---|---|---|---|---|
| 07J | 7765 | LITTLE MUDDY CREEK | **4.850** | 426.00 | 10.40 | 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 | 0.72 | 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 |
|---|---|---|---|---|---|---|---|
| Gehmans School | PA0033553 | 0.0014 | 0.0014 | 0.0014 | 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 | 5.00 | 8.24 | 0.00 | 0.00 |
| NH3-N | 25.00 | 0.00 | 0.00 | 0.70 |

## Input Data WQM 7.0

| SWP Basin | Stream Code | Stream Name | RMI | Elevation (ft) | Drainage Area (sq mi) | Slope (ft/ft) | PWS Withdrawal (mgd) | Apply FC |
|---|---|---|---|---|---|---|---|---|
| 07J | 7765 | LITTLE MUDDY CREEK | **4.640** | 424.00 | 10.70 | 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 | 0.72 | 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 | 5.00 | 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 |
|---|---|---|
| 07J | 7765 | LITTLE MUDDY 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** | | | | | | | | | | | | |
| 4.850 | 0.72 | 0.00 | 0.72 | .0022 | 0.00180 | .506 | 14.87 | 29.4 | 0.10 | 0.133 | 20.01 | 7.00 |
| **Q1-10 Flow** | | | | | | | | | | | | |
| 4.850 | 0.46 | 0.00 | 0.46 | .0022 | 0.00180 | NA | NA | NA | 0.07 | 0.171 | 20.02 | 7.00 |
| **Q30-10 Flow** | | | | | | | | | | | | |
| 4.850 | 0.98 | 0.00 | 0.98 | .0022 | 0.00180 | NA | NA | NA | 0.11 | 0.112 | 20.01 | 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 Wasteload Allocations

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07J | 7765 | LITTLE MUDDY 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 |
|---|---|---|---|---|---|---|---|
| 4.850 | Gehmans School | 16.73 | 50 | 16.73 | 50 | 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 |
|---|---|---|---|---|---|---|---|
| 4.850 | Gehmans School | 1.89 | 25 | 1.89 | 25 | 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) | | |
| 4.85 | Gehmans School | 25 | 25 | 25 | 25 | 5 | 5 | 0 | 0 |

# WQM 7.0 D.O.Simulation

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07J | 7765 | LITTLE MUDDY CREEK |

| RMI | Total Discharge Flow (mgd) | Analysis Temperature (°C) | Analysis pH |
|---|---|---|---|
| 4.850 | 0.001 | 20.015 | 7.000 |
| **Reach Width (ft)** | **Reach Depth (ft)** | **Reach WDRatio** | **Reach Velocity (fps)** |
| 14.868 | 0.506 | 29.401 | 0.096 |
| **Reach CBOD5 (mg/L)** | **Reach Kc (1/days)** | **Reach NH3-N (mg/L)** | **Reach Kn (1/days)** |
| 2.07 | 0.049 | 0.07 | 0.701 |
| **Reach DO (mg/L)** | **Reach Kr (1/days)** | **Kr Equation** | **Reach DO Goal (mg/L)** |
| 8.233 | 15.962 | Owens | 5 |
| **Reach Travel Time (days)** | | | |
| 0.133 | | | |

**Subreach Results**

| TravTime (days) | CBOD5 (mg/L) | NH3-N (mg/L) | D.O. (mg/L) |
|---|---|---|---|
| 0.013 | 2.07 | 0.07 | 8.24 |
| 0.027 | 2.07 | 0.07 | 8.24 |
| 0.040 | 2.06 | 0.07 | 8.24 |
| 0.053 | 2.06 | 0.07 | 8.24 |
| 0.067 | 2.06 | 0.07 | 8.24 |
| 0.080 | 2.06 | 0.07 | 8.24 |
| 0.093 | 2.06 | 0.07 | 8.24 |
| 0.107 | 2.06 | 0.07 | 8.24 |
| 0.120 | 2.06 | 0.07 | 8.24 |
| 0.133 | 2.06 | 0.07 | 8.24 |

# WQM 7.0 Effluent Limits

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07J | 7765 | LITTLE MUDDY 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) |
|---|---|---|---|---|---|---|---|
| 4.850 | Gehmans School | PA0033553 | 0.001 | CBOD5 | 25 | | |
| | | | | NH3-N | 25 | 50 | |
| | | | | Dissolved Oxygen | | | 5 |

TRC_CALC

| 1A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|
| 2 | **TRC EVALUATION** | | | | | |
| 3 | Input appropriate values in B4:B8 and E4:E7 | | | | | |
| 4 | 0.721 | = Q stream (cfs) | | 0.5 | = CV Daily | |
| 5 | 0.0014 | = Q discharge (MGD) | | 0.5 | = CV Hourly | |
| 6 | 30 | = no. samples | | 1 | = AFC_Partial Mix Factor | |
| 7 | 0.3 | = Chlorine Demand of Stream | | 1 | = CFC_Partial Mix Factor | |
| 8 | 0 | = Chlorine Demand of Discharge | | 15 | = AFC_Criteria Compliance Time (min) | |
| 9 | 0.5 | = BAT/BPJ Value | | 720 | = CFC_Criteria Compliance Time (min) | |
| | 0 | = % Factor of Safety (FOS) | | | =Decay Coefficient (K) | |
| 10 | Source | Reference | AFC Calculations | | Reference | CFC Calculations |
| 11 | TRC | 1.3.2.iii | WLA afc = 106.215 | | 1.3.2.iii | WLA cfc = 103.544 |
| 12 | PENTOXSD TRG | 5.1a | LTAMULT afc = 0.373 | | 5.1c | LTAMULT cfc = 0.581 |
| 13 | PENTOXSD TRG | 5.1b | LTA_afc= 39.578 | | 5.1d | LTA_cfc = 60.195 |
| 14 | | | | | | |
| 15 | Source | | Effluent Limit Calculations | | | |
| 16 | PENTOXSD TRG | 5.1f | AML MULT = 1.231 | | | |
| 17 | PENTOXSD TRG | 5.1g | AVG MON LIMIT (mg/l) = 0.500 | | BAT/BPJ | |
| 18 | | | 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)** |