Pennsylvania Department of Environmental Protection

Northwest Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0100960**
Facility Type	**Municipal**	APS ID	**1110900**
Major / Minor	**Minor**	Authorization ID	**1479486**

Applicant and Facility Information

Applicant Name	**Bloomfield Township Sewer Authority**	Facility Name	**Bloomfield Township STP**
Applicant Address	22978 Shreve Ridge Road	Facility Address	22978 Shreve Ridge Road
	Union City, PA 16438-3540		Union City, PA 16438-3540
Applicant Contact	Joseph Miller	Facility Contact	Wayne Tyson
Applicant Phone	(814) 694-3409	Facility Phone	(814) 694-2453
Client ID	44311	Site ID	571455
Ch 94 Load Status	Not Overloaded	Municipality	Bloomfield Township
Connection Status	No Limitations	County	Crawford
Date Application Received	March 15, 2024	EPA Waived?	Yes
Date Application Accepted		If No, Reason	
Purpose of Application	This is an application for a renewal of an Individual Sewage Permit for Bloomfield Townships Sewage Treatment Plant.		

Summary of Review

The Bloomfield Township STP is an existing discharge that serves Bloomfield Township. Treatment consists of a two-lagoon system with chlorine disinfection.

Act 14 – Notifications were submitted and received.

Various changes to the effluent limitations are proposed with the renewal of this permit. No evidence exists of modeling being performed in the last two permit cycles and some of the WQBELs the modeling projected are more stringent than existing models. Effluent limit development will be discussed further into the fact sheet.

Sludge use and disposal description and location(s): Sludge is land filled.

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		Dustin Hargenrater Dustin Hargenrater / Civil Engineer (General)	February 11, 2025
X		Adam Olesnanik Adam Olesnanik, P.E. / Environmental Engineer Manager	February 11, 2025

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	.35
Latitude	41º 47' 44.85"	Longitude	-79º 50' 25.76"
Quad Name	Lake Canadohta	Quad Code	41079G7
Wastewater Description:	Sewage Effluent		

Receiving Waters	Oil Creek (CWF)	Stream Code	54128
NHD Com ID	100468789	RMI	0.0200
Drainage Area	8.3	Yield (cfs/mi^2)	0.053
Q_{7-10} Flow (cfs)	0.44	Q_{7-10} Basis	USGS - StreamStats
Elevation (ft)	1,369	Slope (ft/ft)	---
Watershed No.	16-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		Name	

Background/Ambient Data		Data Source
pH (SU)	7.0	Default
Temperature (°F)	20	Default
Hardness (mg/L)	100	Default
Other:		

Nearest Downstream Public Water Supply Intake	Aqua Pennsylvania Inc. - Emlenton		
PWS Waters	Allegheny River	Flow at Intake (cfs)	1,376
PWS RMI	90.0	Distance from Outfall (mi)	83.6

Changes Since Last Permit Issuance: StreamStats calculated Q_{7-10} values used with this permit issuance. Previously Q_{7-10} flow was based on the Oil Creek at Rouseville gauge station.

Treatment Facility Summary				

Treatment Facility Name: Bloomfield Township STP

WQM Permit No.	Issuance Date
2005403	1/9/2006
2005403 A-1	9/5/2008

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary	Aerated Lagoon	Gas Chlorine	0.35

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.35	584	Not Overloaded	Sludge Lagoon	Landfill

Changes Since Last Permit Issuance: No changes since last permit issuance.

Other Comments: WQM application 2082401 dated 1/4/1982, revised July & August 1982, issued on 7 October 1982 with 1972 standard sewerage conditions 3, 4, 5, 7, 8, 9, 10, 11, 14, 15, 16, 19, 20, 21, 22, 30, 31, 32, and 33, and all undated soil erosion control conditions, and special conditions A for recording and B for PA Fish Commission for a trout stocked fishery is for a two cell aerated lagoon system and 8 pump stations. Single lagoon volume is 3 523 000-gallons. The TSS load is 220-mg/L or 642-PPP based on 0.35-MGD and 0.18-ppcd. The organic load is 200-mg/l or 584-PPD based on 0.35-MGD and 0.17-ppcd. The design load is flow and concentration based as the stated design per capita values are different with a 595-PPD organic load and 630-PPD inorganic load.

The facility design included season operation (3500 people in summer and 1000 people in winter).

Pump Stations

	Capacity	
	gpm	gpd
Ghost Town Grinder	6	864
#1	94	135 360
#2	150	216 000
#3	250	360 000
#4	350	504000
#5	550	792 000
#6	650	936 000
#7	150	216 000
#8	400	576 000
#1a	29	41 760
9	29	41 760

Compliance History	
Summary of DMRs:	Two violations of effluent limitations for TSS were reported on the 8/2023 DMR. The operator submitted the non-compliance report form and commented that algae was high due to high temps and excessive sunny days.
Summary of Inspections:	There have been 4 inspections in the last permit term. None of the inspections resulted in violations to the facility.

Other Comments: **There are no open violations in WMS for the subject Client ID (44311) as of 1/30/25.**

Certified full-time operators are Michael Kelly and Wayne Tyson

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** .35
Latitude 41º 47' 44.99" **Longitude** -79º 50' 25.45"
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)

Fecal Coliform maximum limits were subject to a typo in the last permit. The typo consisted of the maximum limits being 10 times more than the standards set forth in Chapter 92a.47(a)(4). This renewal corrects these limits and the facility will still be able meet the limits.

Water Quality-Based Limitations

The following limitations were determined through water quality modeling (output files attached):

Parameter	Limit (mg/l)	SBC	Model
DO	5.0	Daily Minimum	5.0 (WQM 7.0)
NH3-N (Summer)	3.0	Average Monthly	3.11 (WQM 7.0)
TRC	0.31	Average Monthly	0.312 (TRC_CALC)

Dissolved Oxygen is being proposed as a 5.0 mg/l daily minimum limitation based on the Water Quality Standards in 25 PA Code Chapter 93.7. The standards state “For flowing waters, 7-day average 6.0 mg/L minimum; minimum 5.0 mg/L”. This is more stringent than the current limitations and the facility already meets this limit so a compliance schedule will not be proposed for Dissolved Oxygen.

Ammonia Nitrogen limitations are being proposed as a 3.0 mg/L monthly average limit and 6 mg/L instantaneous maximum limit and load limits of 9.0 lbs/day average monthly limits. The limitations are based on modeling in WQM 7.0 and are more stringent than the current limitations so the more stringent limits will be implemented. This parameter is subject to seasonal variations of three times the proposed summer limit. There has been one instance in 4 years of effluent data that the facility will not meet the proposed limit. Since the facility already meets the new limit at least 75% of the time a compliance schedule is not proposed.

Total Residual Chlorine limitations are proposed as 0.31 mg/L monthly average and 0.94 mg/L instantaneous maximum limitations. These limits are more stringent than the limits on the current permit term and the facility does not already meet this limitation 75% of the time. A 3-year compliance schedule is proposed within the permit to give the facility time to adjust the treatment at the facility if needed.

Anti-Backsliding

No anti-backsliding limits are proposed for this renewal.

Other Notable Changes:

CBOD5 and TSS loading limits have been adjusted. Based on the conversion (Facility Design Flow (MGD) x Proposed Effluent Limit (mg/L) x 8.34 (conversion factor)) the mass loading limits are between the current and proposed mass loading limitations. After looking into why this would be changing although the concentration limits were not changed was due to the use of improper rounding techniques that do not conform to the Permit Writers' Manual.

E. Coli monitoring is introduced into the renewal permit based on the SOP for Establishing Effluent Limitations in Individual Sewage Permits. Based on the SOP sewage dischargers will include monitoring, at a minimum, for E. Coli in new and reissued permits, with a monitoring frequency of 1/quarter for design flows >= 0.05 and < 1 MGD.

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 Three Years After Permit Effective Date.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	Continuous	Recorded
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0 Daily Max	XXX	1/day	Grab
DO	XXX	XXX	5.0 Daily Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.43	XXX	1.4	1/day	Grab
CBOD5	70.0	100	XXX	25.0	35.0	50	1/week	8-Hr Composite
BOD5 Raw Sewage Influent	Report	Report	XXX	Report	Report	XXX	1/week	8-Hr Composite
TSS	85.0	130.0	XXX	30.0	45.0	60	1/week	8-Hr Composite
TSS Raw Sewage Influent	Report	Report	XXX	Report	Report	XXX	1/week	8-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/quarter	Grab
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	1/week	8-Hr Composite
Ammonia Nov 1 - Apr 30	26.0	XXX	XXX	9.0	XXX	18	1/week	8-Hr Composite
Ammonia May 1 - Oct 31	9.0	XXX	XXX	3.0	XXX	6	1/week	8-Hr Composite
Total Phosphorus	XXX	XXX	XXX	Report	XXX	XXX	1/week	8-Hr Composite

Compliance Sampling Location: Outfall 001, after disinfection.

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: Three Years After 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	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	Continuous	Recorded
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0 Daily Max	XXX	1/day	Grab
DO	XXX	XXX	5.0 Daily Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.31	XXX	0.94	1/day	Grab
CBOD5	70.0	100	XXX	25.0	35.0	50	1/week	8-Hr Composite
BOD5 Raw Sewage Influent	Report	Report	XXX	Report	Report	XXX	1/week	8-Hr Composite
TSS	85.0	130.0	XXX	30.0	45.0	60	1/week	8-Hr Composite
TSS Raw Sewage Influent	Report	Report	XXX	Report	Report	XXX	1/week	8-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/quarter	Grab
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	1/week	8-Hr Composite
Ammonia Nov 1 - Apr 30	26.0	XXX	XXX	9.0	XXX	18	1/week	8-Hr Composite
Ammonia May 1 - Oct 31	9.0	XXX	XXX	3.0	XXX	6	1/week	8-Hr Composite
Total Phosphorus	XXX	XXX	XXX	Report	XXX	XXX	1/week	8-Hr Composite

Compliance Sampling Location: Outfall 001, after disinfection.

WQM 7.0 Modeling Output Files

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
16E	54128	OIL CREEK	**40.700**	1369.00	8.30	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	0.053	0.00	0.44	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
Bloomfiled Twp	PA0100960	0.3500	0.3500	0.3500	0.000	25.00	7.66

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
16E	54128	OIL CREEK	**40.200**	1356.00	17.50	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	0.057	0.00	0.99	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	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
16E	54128	OIL 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												
40.700	0.44	0.00	0.44	.5414	0.00492	.51	14.76	28.93	0.13	0.234	22.76	7.24
Q1-10 Flow												
40.700	0.28	0.00	0.28	.5414	0.00492	NA	NA	NA	0.12	0.259	23.29	7.31
Q30-10 Flow												
40.700	0.60	0.00	0.60	.5414	0.00492	NA	NA	NA	0.14	0.216	22.38	7.20

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
16E	54128	OIL 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
40.700	Bloomfiled Twp	9.11	13.85	9.11	13.85	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
40.700	Bloomfiled Twp	1.48	3.11	1.48	3.11	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)		
40.70	Bloomfiled Twp	25	25	3.11	3.11	5	5	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
16E	54128	OIL CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
40.700	0.350	22.758	7.245
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
14.759	0.510	28.930	0.130
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
14.69	1.389	1.71	0.866
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.454	20.547	Owens	5
Reach Travel Time (days)			
0.234			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.023	14.16	1.68	6.56
0.047	13.64	1.65	6.65
0.070	13.15	1.61	6.73
0.094	12.67	1.58	6.80
0.117	12.21	1.55	6.87
0.141	11.77	1.52	6.93
0.164	11.34	1.49	6.99
0.188	10.93	1.46	7.05
0.211	10.53	1.43	7.11
0.234	10.15	1.40	7.16

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
16E	54128	OIL 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)
40.700	Bloomfiled Twp	PA0100960	0.350	CBOD5	25		
				NH3-N	3.11	6.22	
				Dissolved Oxygen			5

TRC_CALC Output Files

TRC_CALC

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

1.04	= Q stream (cfs)	0.5	= CV Daily
0.35	= Q discharge (MGD)	0.5	= CV Hourly
16	= 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 = 0.632	1.3.2.iii	WLA cfc = 0.608
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 0.235	5.1d	LTA_cfc = 0.354

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.326	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.312	AFC
		INST MAX LIMIT (mg/l) = 0.948	

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)**