pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0113051**
Facility Type	**Industrial**	APS ID	**1040445**
Major / Minor	**Minor**	Authorization ID	**1357179**

NPDES PERMIT FACT SHEET INDIVIDUAL INDUSTRIAL WASTE (IW) AND IW STORMWATER

Applicant and Facility Information

Applicant Name	**City of DuBois**	Facility Name	**DuBois Water Treatment Plant**
Applicant Address	16 W Scribner Avenue PO Box 408	Facility Address	5656 Home Camp Road
	DuBois, PA 15801-2210		DuBois, PA 15801
Applicant Contact	Chris Nasuti	Facility Contact	Ben O'Shane
Applicant Phone	(814) 371-2000	Facility Phone	(814) 371-6885
Client ID	75158	Site ID	237918
SIC Code	4941	Municipality	Sandy Township
SIC Description	Water Supply	County	Clearfield
Date Application Received	June 3, 2021	EPA Waived?	Yes
Date Application Accepted	June 14, 2021	If No, Reason	

Purpose of Application: Renewal of an existing NPDES permit for the emergency discharge of water treatment plant effluent.

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		*Derek S. Garner* Derek S. Garner / Project Manager	December 2, 2021
X		*Nicholas W. Hartranft* Nicholas W. Hartranft, P.E. / Environmental Engineer Manager	December 3, 2021

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	n/a – emergency outfall
Latitude	41º 6' 19.27"	Longitude	-78º 41' 20.76"
Quad Name	Luthersburg	Quad Code	1016
Wastewater Description:	Water Treatment Effluent		

Receiving Waters	Laborde Branch (CWF)	Stream Code	48803
NHD Com ID	123860918	RMI	4.3
Drainage Area (mi^2)	7.37	Yield (cfs/mi^2)	0.065
Q_{7-10} Flow (cfs)	0.48	Q_{7-10} Basis	Streamgage No. 03032500
Elevation (ft)	1445	Slope (ft/ft)	n/a
Watershed No.	17-C	Chapter 93 Class.	CWF
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	Metals		
Source(s) of Impairment	Abandoned Mine Drainage		
TMDL Status	Final	Name	Luthersburg and Laborde Branch

Nearest Downstream Public Water Supply Intake	Hawthorn Area Water Authority		
PWS Waters	Redbank Creek	Flow at Intake (cfs)	31.1
PWS RMI	27.84	Distance from Outfall (mi)	50

Facility Summary

The DuBois Water Treatment Plant treats water for potable consumption. The wastewater generated through the treatment process is conveyed to an onsite settling lagoon. During routine operation the lagoon does not discharge. However, during emergencies the lagoon may discharge via Outfall 001 to Laborde Branch.

Compliance History

A review of eDMR submissions indicates the facility had one discharge event during the existing permit's term in March 2017. There were no effluent limit exceedances during the discharge.

The facility was most recently inspected on October 5, 2021. No violations were noted during the inspection.

There are no open violations associated with the permittee.

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** n/a – emergency outfall
Latitude 41º 6' 31.90" **Longitude** -78º 41' 18.80"
Wastewater Description: Water Treatment Effluent

Technology-Based Limitations

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

Parameter	Limit (mg/l)	SBC	State Regulation	DEP Guidance No.
Iron, Dissolved (1)	7.0	IMAX	95.2(4)	
Oil and Grease (1)	15	Average Monthly	95.2(2)(ii)	
	30	IMAX	95.2(2)(ii)	
Total Residual Chlorine	0.5	IMAX	92a.48(b)(3)	
pH (2)	6.0 – 9.0 S.U.	Min – Max	95.2(1)	362-2183-003
Total Suspended Solids (2)	30	Average Monthly		362-2183-003
	60	Daily Maximum		362-2183-003
Iron, Total (2)	2.0	Average Monthly		362-2183-003
	4.0	Daily Maximum		362-2183-003
Aluminum, Total (2)	4.0	Average Monthly		362-2183-003
	8.0	Daily Maximum		362-2183-003
Manganese, Total (2)	1.0	Average Monthly		362-2183-003
	2.0	Daily Maximum		362-2183-003

(1) Since this is an emergency-only outfall, sampling was unable to be completed for the application. Typical water treatment plant sludge lagoon supernatant does not contain appreciable amounts of Dissolved Iron or Oil and Grease. Establishing limits or monitoring requirements for these parameters is not necessary to protect the receiving surface water.

(2) These effluent limits are recommended best practicable control technology currently available (BPT) for water treatment plant wastewater by DEP guidance *"Technology-Based Control Requirements for Water Treatment Plant Wastes" (362-2183-003, 10/1/97)*. These effluent limits reflect lagoon or settling tank treatment of different types of sludges (e.g., presettling, coagulant settling, softening sludge) and filter backwash wastewater. A higher degree of treatment such as best conventional pollutant control technology (BCT) or best available technology economically achievable (BAT) is only appropriate when recycle and/or reuse is employed by the permittee.

Water Quality-Based Limitations

The Luthersburg and Laborde Branch TMDL was finalized on February 12, 2007 to address metals (aluminum, iron, and manganese) and high pH in acidic discharge water from abandoned coalmines throughout the watershed. The TMDL does not assign a wasteload allocation to the DuBois Water Treatment Plant discharge, but it is still necessary to establish limits for aluminum, iron, manganese, and pH to ensure the discharge does not contribute to the impairment. Existing limits for aluminum, iron, and manganese are as follows:

Parameter	Average Monthly	Daily Maximum
Aluminum, Total (1)	0.75	0.75
Iron, Total	1.5	3.0
Manganese, Total	1.0	2.0

(1) Total aluminum is unique in that its only criterion is acute based, whereas iron and manganese are chronic based. Since the criterion is acute based, applying a multiplier to would result in the daily maximum limit not being protective.

A "Reasonable Potential Analysis" conducted in the Toxics Management Spreadsheet v1.3 (attached) confirms that the limits based off criteria are protective.

The Total Residual Chlorine (TRC) Evaluation spreadsheet was used to evaluate the existing WQBEL effluent limits. The spreadsheet (attached) indicates the existing limits of 0.46 mg/l average monthly and 1.51 mg/l instantaneous maximum are protective.

Anti-Backsliding

No limits are proposed to be made less stringent.

Existing Effluent Limitations and Monitoring Requirements

The existing effluent limitations and monitoring requirements are as follows:

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

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	XXX	XXX	XXX	XXX	XXX	2/month	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	9.0 Max	XXX	1/day	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.46	XXX	1.51	1/day	Grab
Total Suspended Solids	XXX	XXX	XXX	30.0	60.0	75	1/month	Composite (1)
Aluminum, Total	XXX	XXX	XXX	0.75	0.75	0.75	1/month	Composite (1)
Iron, Total	XXX	XXX	XXX	1.5	3.0	3.75	1/month	Composite (1)
Manganese, Total	XXX	XXX	XXX	1.0	2.0	2.5	1/month	Composite (1)

Compliance Sampling Location: Outfall 001

(1) Three grab samples collected at the beginning, middle, and end of back wash discharge cycle.

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)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	XXX	XXX	XXX	XXX	XXX	2/month	Measured
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
TRC	XXX	XXX	XXX	0.46	XXX	1.51	1/day	Grab
TSS	XXX	XXX	XXX	30.0	60.0	75	1/month	Composite (1)
Total Aluminum	XXX	XXX	XXX	0.75	0.75	0.75	1/month	Composite (1)
Total Iron	XXX	XXX	XXX	1.5	3.0	3.75	1/month	Composite (1)
Total Manganese	XXX	XXX	XXX	1.0	2.0	2.5	1/month	Composite (1)

Compliance Sampling Location: Outfall 001

(1) Three grab samples collected at the beginning, middle, and end of back wash discharge cycle.

Discharge Information

Instructions | Discharge | Stream

Facility: **DuBois Water Treatment Plant** NPDES Permit No.: **PA0113051** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **Water Treatment Effluent**

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
0.1	100	7						

					0 if left blank		0.5 if left blank		0 if left blank			1 if left blank	
	Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L											
	Chloride (PWS)	mg/L											
	Bromide	mg/L											
	Sulfate (PWS)	mg/L											
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L		750									
	Total Antimony	µg/L											
	Total Arsenic	µg/L											
	Total Barium	µg/L											
	Total Beryllium	µg/L											
	Total Boron	µg/L											
	Total Cadmium	µg/L											
	Total Chromium (III)	µg/L											
	Hexavalent Chromium	µg/L											
	Total Cobalt	µg/L											
	Total Copper	µg/L											
	Free Cyanide	µg/L											
	Total Cyanide	µg/L											
	Dissolved Iron	µg/L											
	Total Iron	µg/L		1500									
	Total Lead	µg/L											
	Total Manganese	µg/L		1000									
	Total Mercury	µg/L											
	Total Nickel	µg/L											
	Total Phenols (Phenolics) (PWS)	µg/L											
	Total Selenium	µg/L											
	Total Silver	µg/L											
	Total Thallium	µg/L											
	Total Zinc	µg/L											
	Total Molybdenum	µg/L											
	Acrolein	µg/L	<										
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<										
	Benzene	µg/L	<										
	Bromoform	µg/L	<										

Group 3	Carbon Tetrachloride	µg/L	<										
	Chlorobenzene	µg/L											
	Chlorodibromomethane	µg/L	<										
	Chloroethane	µg/L	<										
	2-Chloroethyl Vinyl Ether	µg/L	<										
	Chloroform	µg/L	<										
	Dichlorobromomethane	µg/L	<										
	1,1-Dichloroethane	µg/L	<										
	1,2-Dichloroethane	µg/L	<										
	1,1-Dichloroethylene	µg/L	<										
	1,2-Dichloropropane	µg/L	<										
	1,3-Dichloropropylene	µg/L	<										
	1,4-Dioxane	µg/L	<										
	Ethylbenzene	µg/L	<										
	Methyl Bromide	µg/L	<										
	Methyl Chloride	µg/L	<										
	Methylene Chloride	µg/L	<										
	1,1,2,2-Tetrachloroethane	µg/L	<										
	Tetrachloroethylene	µg/L	<										
	Toluene	µg/L	<										
	1,2-trans-Dichloroethylene	µg/L	<										
	1,1,1-Trichloroethane	µg/L	<										
	1,1,2-Trichloroethane	µg/L	<										
	Trichloroethylene	µg/L	<										
	Vinyl Chloride	µg/L	<										
Group 4	2-Chlorophenol	µg/L	<										
	2,4-Dichlorophenol	µg/L	<										
	2,4-Dimethylphenol	µg/L	<										
	4,6-Dinitro-o-Cresol	µg/L	<										
	2,4-Dinitrophenol	µg/L	<										
	2-Nitrophenol	µg/L	<										
	4-Nitrophenol	µg/L	<										
	p-Chloro-m-Cresol	µg/L	<										
	Pentachlorophenol	µg/L	<										
	Phenol	µg/L	<										
	2,4,6-Trichlorophenol	µg/L	<										
Group 5	Acenaphthene	µg/L	<										
	Acenaphthylene	µg/L	<										
	Anthracene	µg/L	<										
	Benzidine	µg/L	<										
	Benzo(a)Anthracene	µg/L	<										
	Benzo(a)Pyrene	µg/L	<										
	3,4-Benzofluoranthene	µg/L	<										
	Benzo(ghi)Perylene	µg/L	<										
	Benzo(k)Fluoranthene	µg/L	<										
	Bis(2-Chloroethoxy)Methane	µg/L	<										
	Bis(2-Chloroethyl)Ether	µg/L	<										
	Bis(2-Chloroisopropyl)Ether	µg/L	<										
	Bis(2-Ethylhexyl)Phthalate	µg/L	<										
	4-Bromophenyl Phenyl Ether	µg/L	<										
	Butyl Benzyl Phthalate	µg/L	<										
	2-Chloronaphthalene	µg/L	<										
	4-Chlorophenyl Phenyl Ether	µg/L	<										
	Chrysene	µg/L	<										
	Dibenzo(a,h)Anthrancene	µg/L	<										
	1,2-Dichlorobenzene	µg/L	<										
	1,3-Dichlorobenzene	µg/L	<										
	1,4-Dichlorobenzene	µg/L	<										
	3,3-Dichlorobenzidine	µg/L	<										
	Diethyl Phthalate	µg/L	<										
	Dimethyl Phthalate	µg/L	<										
	Di-n-Butyl Phthalate	µg/L	<										
	2,4-Dinitrotoluene	µg/L	<										

	2,6-Dinitrotoluene	µg/L	<										
	Di-n-Octyl Phthalate	µg/L	<										
	1,2-Diphenylhydrazine	µg/L	<										
	Fluoranthene	µg/L	<										
	Fluorene	µg/L	<										
	Hexachlorobenzene	µg/L	<										
	Hexachlorobutadiene	µg/L	<										
	Hexachlorocyclopentadiene	µg/L	<										
	Hexachloroethane	µg/L	<										
	Indeno(1,2,3-cd)Pyrene	µg/L	<										
	Isophorone	µg/L	<										
	Naphthalene	µg/L	<										
	Nitrobenzene	µg/L	<										
	n-Nitrosodimethylamine	µg/L	<										
	n-Nitrosodi-n-Propylamine	µg/L	<										
	n-Nitrosodiphenylamine	µg/L	<										
	Phenanthrene	µg/L	<										
	Pyrene	µg/L	<										
	1,2,4-Trichlorobenzene	µg/L	<										
Group 6	Aldrin	µg/L	<										
	alpha-BHC	µg/L	<										
	beta-BHC	µg/L	<										
	gamma-BHC	µg/L	<										
	delta BHC	µg/L	<										
	Chlordane	µg/L	<										
	4,4-DDT	µg/L	<										
	4,4-DDE	µg/L	<										
	4,4-DDD	µg/L	<										
	Dieldrin	µg/L	<										
	alpha-Endosulfan	µg/L	<										
	beta-Endosulfan	µg/L	<										
	Endosulfan Sulfate	µg/L	<										
	Endrin	µg/L	<										
	Endrin Aldehyde	µg/L	<										
	Heptachlor	µg/L	<										
	Heptachlor Epoxide	µg/L	<										
	PCB-1016	µg/L	<										
	PCB-1221	µg/L	<										
	PCB-1232	µg/L	<										
	PCB-1242	µg/L	<										
	PCB-1248	µg/L	<										
	PCB-1254	µg/L	<										
	PCB-1260	µg/L	<										
	PCBs, Total	µg/L	<										
	Toxaphene	µg/L	<										
	2,3,7,8-TCDD	ng/L	<										
Group 7	Gross Alpha	pCi/L											
	Total Beta	pCi/L	<										
	Radium 226/228	pCi/L	<										
	Total Strontium	µg/L	<										
	Total Uranium	µg/L	<										
	Osmotic Pressure	mOs/kg											

Stream / Surface Water Information

DuBois Water Treatment Plant, NPDES Permit No. PA0113051, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Laborde Branch**

No. Reaches to Model: **1**

- (●) Statewide Criteria
- ( ) Great Lakes Criteria
- ( ) ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi²)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	048803	4.3	1445	7.37			Yes
End of Reach 1	048803	3.42	1432	7.99			Yes

Q $_{7\text{-}10}$

Location	RMI	LFY (cfs/mi²)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	4.3	0.065										100	6.5		
End of Reach 1	3.42	0.065													

Q $_{h}$

Location	RMI	LFY (cfs/mi²)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	4.3														
End of Reach 1	3.42														

Model Results

DuBois Water Treatment Plant, NPDES Permit No. PA0113051, Outfall 001

Instructions | Results | RETURN TO INPUTS | SAVE AS PDF | PRINT | ◉ All ○ Inputs ○ Results ○ Limits

☑ ***Hydrodynamics***

Q_{7-10}

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
4.3	0.48		0.48	0.155	0.003	0.484	13.095	27.04	0.1	0.538	7.534
3.42	0.52		0.519								

Q_h

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
4.3	3.91		3.91	0.155	0.003	1.096	13.095	11.943	0.283	0.19	3.581
3.42	4.191		4.19								

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 7.534 PMF: 1 Analysis Hardness (mg/l): 100 Analysis pH: 6.58

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Aluminum	0	0		0	750	750	3,072	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	N/A	N/A	N/A	

☑ ***CFC*** CCT (min): 7.534 PMF: 1 Analysis Hardness (mg/l): 100 Analysis pH: 6.58

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	6,145	WQC = 30 day average; PMF = 1
Total Manganese	0	0		0	N/A	N/A	N/A	

☑ ***THH*** CCT (min): 7.534 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	1,000	1,000	4,097	

☑ ***CRL*** CCT (min): 3.581 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	N/A	N/A	N/A	

☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Total Aluminum	Report	Report	Report	Report	Report	µg/L	1,969	AFC	Discharge Conc > 10% WQBEL (no RP)
Total Iron	Report	Report	Report	Report	Report	µg/L	6,145	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Manganese	Report	Report	Report	Report	Report	µg/L	4,097	THH	Discharge Conc > 10% WQBEL (no RP)

☑ ***Other Pollutants without Limits or Monitoring***

The following pollutants do not require effluent limits or monitoring based on water quality because reasonable potential to exceed water quality criteria was not determined and the discharge concentration was less than thresholds for monitoring, or the pollutant was not detected and a sufficiently sensitive analytical method was used (e.g., <= Target QL).

Pollutants	Governing WQBEL	Units	Comments

1A	B	C	D	E	F	G
2	**TRC EVALUATION**					
3	Input appropriate values in B4:B8 and E4:E7					
4	0.48	= Q stream (cfs)		0.5	= CV Daily	
5	0.1	= 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)		0	=Decay Coefficient (K)	
10	Source	Reference	AFC Calculations		Reference	CFC Calculations
11	TRC	1.3.2.iii	WLA afc = 1.009		1.3.2.iii	WLA cfc = 0.976
12	PENTOXSD TRG	5.1a	LTAMULT afc = 0.373		5.1c	LTAMULT cfc = 0.581
13	PENTOXSD TRG	5.1b	LTA_afc= 0.376		5.1d	LTA_cfc = 0.567
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) = 0.463		AFC	
18			INST MAX LIMIT (mg/l) = 1.513			

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)