

DEP TOXICS MANAGEMENT SPREADSHEET (TMS) INSTRUCTIONS

Revised, February 18, 2021

Introduction

The Department of Environmental Protection (DEP) has developed the DEP Toxics Management Spreadsheet (“TMS”) to facilitate calculations necessary for completing a reasonable potential (RP) analysis and determining water quality-based effluent limitations for discharges of toxic pollutants. The spreadsheet combines the functionality of DEP’s Toxics Screening Analysis (TSA) spreadsheet and PENTOXSD water quality model. Differences between the TMS and TSA/PENTOXSD can be found in **Attachment A**.

The spreadsheet was designed using the latest version of Microsoft Excel® and is in macro-enabled binary file (XLSB) format. Macros must be enabled for the TMS to function. The TMS is not guaranteed to work with earlier versions of Excel®. Questions on the use of the spreadsheet can be directed to the Bureau of Clean Water at RA-EPNPDES_Permits@pa.gov.

General Information

NOTE – It is important that the user follow these instructions carefully. Omission of data in any cell designed for data entry may result in the failure of important calculations on the same or different worksheets.

If prompted by Excel after opening the spreadsheet, enable editing and macros. *Note that you may need to add additional Trusted Locations in the Trust Center Settings of Excel in order to run the macros.* These locations may include server drives and/or locations where you intend to save the file for use. The following steps may be taken:

1. Excel Options > Trust Center > Trust Center Settings > Trusted Locations
2. Check the box to “Allow Trusted Locations on my network”
3. Select “Add new location”
4. Browse to select the folder (or server) where the file will be saved, check the “Subfolders of this location are also trusted” box, and then OK.

The spreadsheet consists of four hyperlink tabs with corresponding worksheets: Instructions, Discharge, Stream, and Results. The Results Worksheet is available only when the Calculate operation is executed from the Discharge or Stream Worksheets. An additional worksheet, Reference, shows water quality criteria and other relevant data for toxic pollutants, which are used in the calculations. A versions tab is also visible to identify changes made to the spreadsheet over time. To begin, click on the General tab.

NOTE - The spreadsheet is intended for the evaluation of discharges from a **single discharge point**.

All cells available for data entry or selection from a drop-down menu are highlighted. The user may use the Tab key to move from cell to cell. The spreadsheet is protected.

This document is only intended to aid in use of the TMS. An explanation of the calculations is available in DEP’s [Technical Reference Guide \(TRG\) PENTOXSD for Windows PA Single Discharge Wasteload Allocation Program for Toxics Version 2.0 \(391-2000-011\)](#).

Validation that exists in the spreadsheet is highlighted and explained in this document.

NOTE – Throughout the spreadsheet decisions were made concerning cell formatting with respect to the number of decimal places displayed. The number displayed in a cell is not necessarily the number that is stored by the spreadsheet. Therefore, you may not be able to replicate a calculated value using only the numbers displayed in the cells due to the spreadsheet’s rounding of input values to meet formatting requirements.

Discharge Worksheet

Discharge Information

Instructions Discharge Stream
CLEAR PROJECT CLEAR FORM CALCULATE

Facility: NPDES Permit No.: Outfall No.:
 Evaluation Type: Wastewater Description:

The CLEAR PROJECT button will clear all inputs and any generated results from each worksheet in the spreadsheet. The CLEAR FORM button will clear all inputs on the Discharge Worksheet. There will be a warning before the form or project data are cleared. The CALCULATE button will execute the model and open the Results Worksheet when minimum data entry requirements are met (those denoted with a red asterisk).

Enter the name of the facility, the NPDES Permit Number and the Outfall ID number for which the analysis is being conducted. A separate spreadsheet must be used for each discharge or outfall.

- **Evaluation Type** – Select “Major Sewage/Industrial” to conduct a screening analysis as part of a permit renewal for a major sewage facility or industrial discharge. This selection will pre-populate the pollutant groups from the NPDES permit application. Select “Custom/Additive” to create your own pollutant list.

NOTE: When you switch from to “Custom/Additive” any inputs entered in the Pollutant table will be cleared.

- **Wastewater Description** – Enter a description of the wastewater being discharged.

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
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

- **Design Flow (MGD)** – Enter the design flow of the discharge that will be used for modeling
- **Hardness (mg/L) and pH (SU)** – Enter the hardness of the discharge in mg/L and the pH in SU. These values are used to calculate criteria for certain parameters based on in-stream hardness and pH following mixing with the receiving water.
- **Parital Mix Factors (PMFs)** – Partial Mix Factors (PMFs) may be entered when known. PMFs represent the percentage of discharge flow that has mixed with stream flow at the Criteria Compliance Time (CCT), which is the point at which compliance with water quality criteria is evaluated. An input into any of these fields overrides the normal mixing calculations and forces the PMF to the input value for the applicable water quality criterion. CCTs and design stream flows for each water quality criterion are shown in Table 1 below.

Table 1: Criteria Compliance Times and Design Flows

Criterion	CCT	Design Flow
Acute Fish Criterion (AFC)	15 minutes	Q ₇₋₁₀
Chronic Fish Criterion (CFC)	12 hours	Q ₇₋₁₀
Threshold Human Health (THH)	12 hours or PWS	Q ₇₋₁₀
Carcinogen Risk Level (CRL)	12 hours	Q _h

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NOTE: The TMS will calculate and display the PMF at a downstream public water supply (PWS) when a PWS withdrawal is entered. Entering a THH PMF will override both the THH and PWS PMFs calculated by the TMS. Where the PWS PMF is less than the THH PMF, the PWS PMF will be used in the calculation of THH and PWS wasteload allocations (WLAs).

- **Complete Mix Time (min)** – When known the complete mix time (CMT) may be entered in minutes for both design stream flow conditions. This value is defined as the time in which the discharge has completely mixed with the stream. Input values of CMT directly influence the model’s calculation of PMF. Note that if the PMF is manually input as an override in the Discharge Input Data, this PMF value will be used without regard to CMT inputs.

Discharge Pollutant	Units	Max Discharge Conc	0 if left blank		0.5 if left blank		0 if left blank			1 if left blank		
			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										
Total Aluminum	µg/L											
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											

Instructions Discharge Stream Reference Versions

- **Discharge Pollutant** – Where “Major Sewage/Industrial” is selected for “Evaluation Type,” the pollutant groups from the NPDES permit application will automatically populate. All data available on the application should be entered. Where “Custom/Additives” is selected for “Evaluation Type,” blank rows will be available to select any pollutant available on the Reference Worksheet through the use of the dropdown menu. Any pollutant added to the end of the pollutant list in the Reference Worksheet will be available for selection. Instructions for adding additional pollutants or chemical additives to the Reference Worksheet are provided below.

Discharge Pollutant	Units
1,1,1-Trichloroethane	
1,1,2,2-Tetrachloroethane	
1,1,2-Trichloroethane	
1,1-Dichloroethane	
1,1-Dichloroethylene	
1,2,3-Trichloropropane	
1,2,4-Trichlorobenzene	
1,2,4-Trimethylbenzene	

NOTE: You should not select the same pollutant more than once. The TMS will only use the inputs from each pollutant’s first appearance on the worksheet.

- **Units** – Use the dropdown menu to select the proper units for the value that will be entered in the Max Discharge Conc column.
- **Max Discharge Conc** – For NPDES permit renewals, enter the maximum concentration reported in the permit application or Discharge Monitoring Reports (DMRs). This value will be used to conduct the reasonable potential

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(RP) analysis after a WQBEL is calculated. Alternatively, if there are sufficient data (10 or more data points), enter the "AMEC" concentration calculated by the TOXCONC.xls spreadsheet. If the maximum concentration is a "non-detect" result, enter the less than symbol (<) in the left side of the cell (double-click to toggle < on and off).

- **Trib Conc** – Currently unavailable, but will be used in future versions of the spreadsheet to report tributary stream concentrations.
- **Stream Conc** – When known, enter the background concentration of the pollutant in the same units as the discharge concentration. This is generally the concentration in the stream above the point of discharge. The Stream Concentration value will be modeled as a steady-state background concentration unless a Stream CV also is entered. This Stream Concentration value is subject to decay if a Fate Coefficient is entered.

VALIDATION – If the Stream Conc is greater than the most stringent criteria the worksheet will give a warning that the limits may be set to criteria.

- **Daily CV and Hourly CV** - If known, enter the daily and/or hourly coefficient of variation (CV) of the pollutant concentration in the discharge.
- **Stream CV** – If known, enter the CV of the pollutant concentration in the surface water. Stream CV will only effect WLAs that are based on AFC or CFC criteria.
- **Fate Coeff** – When known, the first order decay of a pollutant in the stream may be entered in units of day⁻¹. Fate coefficients should not be entered unless the parameter is subject to natural degradation or volatilization within the time frame defined by the CCT for the applicable criterion. The fate coefficient can be determine using DEP’s [Protocol for Estimating First Order Pollutant Fate Coefficients for Volatile Organic Substances \(391-2000-020\)](#).
- **FOS** – A Factor of Safety (FOS) may be entered to address uncertainties in the input data for the discharge being evaluated. The FOS will reduce the calculated water quality-based effluent limit for any governing criterion.
- **Criteria Mod.** – The criteria modifier, which provides a mechanism to increase or decrease the AFC or CFC criteria for a given parameter, may be entered when site-specific studies have been approved by DEP. This is most commonly used to enter the results of a Water Effects Ratio (WER). Results of a Biotic Ligand Model (BLM) study (i.e., for Copper) should be entered as a separate criterion on the Reference Worksheet
- **Chemical Transl** – If a chemical translator study was preformed which indicates that the dissolved portion of the total recoverable metal is different than the default values in the model (which are from 25 Pa. Code § 93.8b) the site-specific chemical translator can be entered. The default values can be found in the Reference Worksheet.

Stream Worksheet

Instructions Discharge **Stream** CLEAR FORM CALCULATE

Receiving Surface Water Name: _____ No. Reaches to Model: 1

Statewide Criteria
 Great Lakes Criteria
 ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi ²)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge							Yes
End of Reach 1							Yes

The CLEAR FORM button will clear all inputs on the Stream Worksheet. There will be a warning before the form data are cleared. The CALCULATE button will execute the model and open the Results Worksheet. The model will only run when the minimum required inputs (those denoted with a red asterisk) have been entered.

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Enter the receiving surface water name. The current version of the TMS will only model one reach.

The default criteria applied are the statewide criteria from 25 Pa. Code Chapter 93. If the discharge is located anywhere in the Great Lakes Basin, the Great Lakes Criteria should be selected. If the discharge is to the main stem of the Ohio River, the ORSANCO Criteria should be applied. When the Great Lakes or ORSANCO criteria are selected, the most stringent of the Great Lakes/ORSANCO and statewide criteria will be applied.

- **Stream Code** – Enter the stream code as listed in the [PA Gazetteer of Streams](#). This information is required for documentation purposes, but will not affect the results of the model.
- **RMI** – Enter the River Mile Index (RMI) at the point of discharge and the downstream end of the reach. The RMI is the distance in miles from the mouth of the river or stream. The first “Point of Discharge” RMI should correspond to the outfall location. The second “End of Reach 1” RMI should be some point downstream. If a Potable Water Supply (PWS) will be entered in the model, the RMI for the location of the PWS should be entered as the end of the modeled reach.
- **Elevation (ft)** – Enter the elevation in feet at each RMI.
VALIDATION – The elevation at the End of Reach 1 must be lower than the elevation at the Point of Discharge.
- **DA (mi²)** – Enter the drainage area in square miles at each RMI
VALIDATION – The drainage area at the End of Reach 1 must be greater than the elevation at the Point of Discharge.
- **Slope (ft/ft)** – If known, the slope of the stream channel can be entered in feet of vertical descent per foot of horizontal travel downstream. If left blank, slope will be calculated based on the RMIs and elevations of each location. If entered, the value will override the calculation.
- **PWS Withdrawal (MGD)** – If there is a PWS Withdrawal downstream of the discharge, enter the rate of withdrawal in MGD at the second RMI.
- **Apply Fish Criteria** – Aquatic life criteria should typically be applied (“Yes”) except in rare cases where it is determined a stream cannot support aquatic life and the point of first use is downstream. This should be confirmed by DEP’s Bureau of Clean Water, Water Quality Division before the value is set to “No.” Note that “No” must be selected at both RMIs.

Following the summary table described above, there are two tables that request reach detail information for the Q₇₋₁₀ and Q_h (harmonic stream flow) design conditions, as explained below. Note that only those fields with red asterisks require data entry for the model to calculate results.

Q₇₋₁₀

Location	RMI	LFY (cfs/mi ²)*	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		0.1										100	7		
End of Reach 1		0.1													

Q_h

Location	RMI	LFY (cfs/mi ²)*	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															
End of Reach 1															

- **LFY** – If known, a Low Flow Yield (LFY) can be entered. LFY is the amount of surface water flow per square mile of drainage area that the model will use to estimate the Q₇₋₁₀ flow in the absence of any other flow data. If stream flows are entered the flows will override any LFY input.
- **Flows (cfs)** –

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- **Stream** – If known, enter the Q_{7-10} and/or the Q_h of the stream at the node. The stream flow is absolute amount of stream flow in cubic feet per second (cfs) that is known to exist at a stream node. Where a value is entered it will override any calculation used by the model to determine stream flow. Where Q_{7-10} is entered that value will be used to calculate Q_h .
- **Tributary** – This is not available in the one reach version of the TMS.
- **W/D Ratio** – If known, the average width-to-depth of the reach at the design stream flow may be entered.
- **Width & Depth (ft)** – If known, enter the average width and depth of the reach at the design stream flow.
- **Velocity (fps)** – If known, enter average velocity in feet per second of the reach at the design stream flow.
- **Travel Time (days)** – If known, enter the average travel time from the point of discharge to the end of reach 1 at the design stream flow.
- **Tributary Hardness and pH** – This information is not used in the one reach version of the TMS.
- **Stream Hardness and pH** – Enter the hardness in mg/L and pH in S.U. of the stream immediately above the point of discharge, if known. By default, the values are 100 mg/L and 7.0 S.U., respectively.
- **Analysis Hardness and pH** – Enter an analysis hardness and pH to override the analysis hardness and pH calculated by the model using discharge and stream hardness and pH values. If entered the model will use the same analysis hardness and pH for each CCT and will override any values entered for discharge and stream hardness or pH.

After data are entered for all required fields, click the CALCULATE button to display results.

Results Worksheet

PENTOXSD Results



The RETURN TO INPUTS button closes the Results Worksheet and returns the user to the Discharge and Stream Worksheets. The SAVE AS PDF button saves the Discharge, Stream and Results tab as a PDF. It will open a pop-up for the user to select a location to save the document. The PRINT button prints the information to the default printer selected by the radio button:

- All – prints the Discharge, Stream and Results Worksheets
- Inputs – prints the Discharge and Stream Worksheets
- Results – prints the Results Worksheet
- Limits – prints the recommended WQBELs & Monitoring Requirements in the Results Worksheet

Each section of the Results Worksheet (Hydrodynamics, Wasteload Allocations, Recommended WQBELs & Monitoring Requirements and Other Pollutants without Limits or Monitoring) can be hidden by unchecking the checkbox next to it.

Hydrodynamics

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Hydrodynamics

Q₇₋₁₀

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)
5	1,000		1,000	3.094	0.00038	1.034	329.229	318.32	2.946	0.01	7212.602
4.5	1000.100	0.774	999.3265								

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)
5	3111.64		3111.64	3.094	0.00038	1.703	329.229	193.352	5.556	0.005	3428.783
4.5	3111.908	0.774	3111.13								

Hydrodynamic results are given for both the Q₇₋₁₀ and the Q_h design conditions.

- **RMI** – The RMIs as entered on the Stream Worksheet.
- **Stream Flow (cfs)** – At the first RMI, Stream Flow is the user entered flow or the flow calculated by the model in the absence of an entered flow. This is the flow used in the calculation of WLAs. At the second RMI additional flow due to drainage area is included.
- **PWS Withdrawal (cfs)** – If a PWS Withdrawal, in MGD, was entered in the Stream Worksheet, the value will be converted to the unit of cfs and will be displayed.
- **Net Stream Flow (cfs)** – The stream flow minus the PWS Withdrawal.
- **Discharge Analysis Flow (cfs)** – The discharge flow, in MGD, entered in the Discharge Worksheet, converted to cfs.
- **Slope (ft/ft)** – The slope as entered in the Stream Worksheet or as calculated by the model.
- **Depth & Width (ft)** – The depth and width as entered in the Stream Worksheet or as calculated by the model.
- **W/D Ratio** – The width-to-depth ratio as entered in the Stream Worksheet or as calculated by the model.
- **Velocity (fps)** – The velocity as entered in the Stream Worksheet or as calculated by the model.
- **Travel Time (days)** – The travel time as entered in the Stream Worksheet or calculated by the model.
- **Complete Mix Time (min)** – The amount of time in minutes required for the discharge flow and the stream flow to completely mix, as entered in the Discharge Worksheet or calculated by the model.

Wasteload Allocations

Wasteload allocations (WLAs) are broken out by criteria type. Each type can be hidden by unchecking the checkbox

next to it.

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Wasteload Allocations

AFC CCT (min): PMF: Analysis Hardness (mg/l): Analysis pH:

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	250	0		0	750	750	8,120	
Total Copper	0	0		0	11.118	11.6	182	Chem Translator of 0.96 and Criteria Modifier of 1.5 applied

CFC CCT (min): PMF: Analysis Hardness (mg/l): Analysis pH:

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	250	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	7,491	7.8	805	Chem Translator of 0.96 and Criteria Modifier of 1.5 applied

THH CCT (min): THH PMF: Analysis Hardness (mg/l): Analysis pH: PWS PMF:

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Chloride (PWS)	0	0		0	250,000	250,000	3,927,386	WQC applied at RMI 4.5 with a design stream flow of 1000.1 cfs
Total Aluminum	250	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	

CRL CCT (min): PMF: Analysis Hardness (mg/l): Analysis pH:

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	250	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	

CCT (min) – The criteria compliance time allowed for mixing before the criterion is applied. For CFC, AFC and CRL, it is the lesser of the times in Table 1 or the time at which complete mix occurs. For THH criteria, it is the lesser of the time below, the time at which complete mix occurs or the time at which the discharge reaches a PWS.

PMF – The Partial Mix Factor as entered in the Discharge Worksheet or as calculated by the model. For THH, if a PWS Withdrawal was entered, the PMF applied at the PWS will be displayed separately.

Stream Conc (µg/L) – The stream concentration as entered in the Discharge Worksheet. If no value was entered the stream concentration will be zero.

Analysis Hardness (mg/L) – The analysis hardness as entered in the Stream Worksheet or as calculated by the model.

Analysis pH (S.U.) – The analysis pH as entered in the Stream Worksheet or as calculated by the model.

Pollutants – All pollutants for which a discharge concentration was entered in the Discharge Worksheet will appear under each WLA criterion.

Stream CV – The stream coefficient of variation as entered in the Discharge Worksheet. If no value was entered the stream CV will be zero.

Trib Conc (ug/L) – Trib Conc is not available in this version of the TMS.

Fate Coef – the fate coefficient as entered on the Discharge tab. If no value was entered the fate coefficient will be zero.

WQC (µg/L) – The water quality criterion from Chapter 93 or Great Lakes / ORSANCO criteria, as applicable.

WQ Obj (µg/L) – The water quality objective is used to develop the WLA. It will be different from the WQC when a chemical translator is applied to WQC that are for dissolved metals.

WLA (µg/L) – The wasteload allocation is the allowable amount of pollutant in the discharge at which the instream criterion will be met. The WLA is calculated using the water quality objective.

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Comments – Comments are shown anytime a chemical translator or criteria modifier has been applied, when parameters are applied at a PWS, or when the WLA is based on criteria because the background concentration exceeds criteria.

Recommended WQBELs & Monitoring Requirements

Recommended WQBELs & Monitoring Requirements

No. Samples/Month:

Pollutants	Mass Limits		Concentration Limits				Governing WQBEL	WQBEL Basis	Comments
	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units			
Total Aluminum	86.8	135	5,204	8,120	13,011	µg/L	5,204	AFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Copper	Report	Report	Report	Report	Report	µg/L	117	AFC	Discharge Conc > 10% WQBEL (no RP)

This section provides recommendations for limits and monitoring that should be included in NPDES permits, based on Standard Operating Procedures (SOPs) and other DEP guidance. All pollutants for which monitoring or limits are recommended will be displayed in this table. See DEP’s [SOP for Establishing Water-Quality Based Effluent Limitations and Permit Conditions for Toxic Pollutants in NPDES Permits for Existing Dischargers](#) for more information.

No. Samples/Month – By default, four samples per month are used to calculate WQBELs. A value less than four cannot be entered. A value greater than four can be selected from the dropdown list if it is known that sampling frequency will be greater than four per month.

Mass Limits – The spreadsheet will recommend mass-based limits calculated using the concentration limits and the design flow entered in the Discharge Worksheet.

Concentration Limits – The Average Monthly Limit (AML), Maximum Daily Limit (MDL) and Instantaneous Maximum (IMAX) recommended by the model.

Governing WQBEL – The most stringent limit calculated by the model needed to achieve water quality criteria.

WQBEL Basis – The criteria type for which the Governing WQBEL was developed.

Comments – Displays the basis for the limits or monitoring recommendation.

Other Pollutants without Limits or Monitoring

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
Chloride (PWS)	3,927	mg/L	Discharge Conc ≤ 10% WQBEL

This section displays all pollutants for which a result was entered in the Discharge Worksheet for which the model did not determine the need for limits or monitoring. The Governing WQBEL will be displayed along with a comment explaining why limits or monitoring were not recommended.

Reference Worksheet

The Reference Worksheet lists all of the pollutants available for modeling with each of their criteria.

The user can input additional pollutants at the bottom of the available pollutants list. Type the pollutant name in the ‘Other’ row that is shaded yellow:

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188	Vinyl Chloride	
189	Other (TYPE HERE)	
190	Other (TYPE HERE)	
191	Other (TYPE HERE)	

To enter other pollutants into the TMS:

- Enter a pollutant name in column A. If units other than $\mu\text{g/L}$ are used it is recommended that they be included in the pollutant name.
- Enter each criterion (AFC, CFC, THH and CRL) that is available in the corresponding columns C through F.
- If a Target Quantitation Limit (TQL) is known it should be entered in column J.
- If the pollutant should be treated as conservative select "Y" in column S. Otherwise, leave column S blank.
- If the THH criterion should only be applied at a PWS intake select "Y" in column T. Otherwise, leave column T blank.

Once a parameter is entered in the Reference Worksheet it will become available for selection in the Discharge Worksheet.

NOTE: Pollutants names should be unique. Using the same name as a pollutant already listed may cause errors in the TMS calculations.

To enter chemical additives from DEP's Approved List of Chemical Additives into the TMS:

- For AFC, enter the value in the approved list for Aquatic Life Effect Levels - Acute Conc. **Be sure to enter the value in terms of micrograms per liter ($\mu\text{g/L}$)** (the approved list concentration values are milligrams per liter (mg/L)).
- For CFC, enter the value in the approved list for Aquatic Life Effect Levels - Chronic Conc. Be sure to enter the value in terms of $\mu\text{g/L}$.
- For THH, enter the value in the approved list for Human Health Safe Usage Conc. IF "CRL" column = "No". Otherwise leave the column blank.
- For CRL, enter the value in the approved list for Human Health Safe Usage Conc. IF "CRL" column = "Yes". Otherwise leave the column blank.

ATTACHMENT A

Differences Between TMS and TSA/PENTOXSD

1. Osmotic Pressure is treated as an acute criterion in the TMS. PENTOXSD treated Osmotic Pressure as a chronic criterion.
2. The radio button must be selected to apply the Great Lakes criteria. In PENTOXSD this was applied automatically based on basin number. Additionally, when the Great Lakes criteria are applied in the TMS no dilution will be allowed for Bioaccumulative Chemical of Concerns (BCCs) and limits will be derived as the most stringent criterion.
3. ORSANCO criteria are incorporated. When the ORSANCO Criteria radio button is selected the more stringent of ORSANCO criteria and statewide criteria will be applied. No dilution is allowed for BCC pollutants.
4. Parameters will no longer be screened out when maximum analytical results are below the most stringent criterion (as is done in the TSA). For the TMS, WQBELs will be developed for all parameters for which a maximum discharge concentration is entered. Parameters will only be screened out as not needing limits or monitoring when a non-detect is reported at or below the Target Quantitation Limit (TQL).
5. Only one reach (two nodes) can be entered in the TMS. Tributaries cannot be entered below the discharge.
6. If the background concentration (stream conc) is greater than criteria the recommended effluent limit will be set to criteria. PENTOXSD would set the recommended effluent limit to the background concentration.
7. The discharge concentration will not be recommended as an effluent limit if it is less than the effluent limit calculated by the TMS. PENTOXSD would recommend the less of the calculated limit and the entered discharge concentration.
8. Limits below the most stringent criterion will not be recommended. In some cases, when AFC governed, PENTOXSD would recommend limits that were below criteria. In these cases, MDL will still be based on the calculated WQBEL (if less stringent than criteria).
9. A PMF will be applied to the PWS criteria that are only applied at a PWS intake (25 Pa Code § 96.3(d)). PENTOXSD allowed for complete mix at the point of withdrawal.
10. Special parameter monitoring requirements for TDS, bromide, chloride, sulfate and 1,4-dioxane requirements no longer apply and are not included in the TMS (starting 10/1/2020).

Revision History

Date	Revision Reason
2/18/2021	Added note that data will be cleared when switching to "Custom/Additives" evaluation type; clarified that the same pollutant should not be selected more than once; expanded instructions for adding pollutants to the reference tab
10/1/2020	Added change in MDL calculation and removal of special parameters monitoring to 'Differences Between TMS and TSA/PENTOXSD' in Attachment A.
7/1/2020	Original