DEP Thermal Limits Spreadsheet Instructions

Final, April 2, 2024

Introduction

The Department of Environmental Protection (DEP) has developed the DEP Thermal Limits Spreadsheet (Spreadsheet) to facilitate development of water-quality based effluent limitations for thermal discharges to surface waters, if necessary. This spreadsheet is a companion to the DEP Implementation Guidance for Temperature Criteria (386-2000-001) (Implementation Guidance). The spreadsheet analyzes Case 1 and Case 2 scenarios as described in the Implementation Guidance (Attachment A). Special protection waters designated as High Quality (HQ) or Exceptional Value (EV) by the DEP may have additional temperature criteria as described in the DEP Anti-Degradation Policy (391-0300-002). Detailed guidance for EV or HQ waters is beyond the scope of this document and the analyst should consult the Anti-Degradation Policy.

The spreadsheet was designed using Microsoft Excel® and is in macro-enabled worksheet (xlsm) format. Questions on the spreadsheet can be directed to the Bureau of Clean Water at RA-EPNPDES_Permits@pa.gov.

General Information

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.

If prompted by Excel to update the spreadsheet after opening the spreadsheet, do not update. Then, if prompted, set the spreadsheet to a trusted source.

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

Instructions on Using the Spreadsheet

Instructions Worksheet

Contains information on using the spreadsheet and a link to these Instructions.

Inputs Worksheet

- Enter the Facility name, Permit & Outfall Number, Stream Name and the name of the Analyst/Engineer who is running the spreadsheet.

- Enter the Q7-10 in units of cubic feet per second (cfs) of the stream upstream of the discharge and intake. **This is a required input**. The flow is adjusted for each monthly or semimonthly time period using Q7-10 Multipliers. Therefore, the assimilative capacity of the stream may vary for each monthly or semimonthly time period.
- Use the dropdown menu to select the Analysis Type. Column(s) will open based on the Ch 93 designation selected. The designations are WWF for warm water fishes, CWF for cold water fishes, TSF for trout stocking fishes, 316a used if a 316a variance was obtained, and for a discharge direct to the Ohio River select ORSANCO. **This is a required input**.

Facility Flows

Enter the facility flow data in million gallons per day (MGD). If a flow/loss does not exist leave the values blank or enter a "0":

- **Intake (Stream) (MGD)** - The flowrate of water withdrawn from the stream for each time period. This should only be used where the outfall is on the same stream as the intake. The intake (stream) value must be greater than the seasonal stream flow, otherwise an error message will appear.

- **Intake (External) (MGD)** - The flowrate of water from sources other than the receiving stream (for example potable water supply, well water, etc.) for each time period.

- **Consumptive Loss (MGD)** – Any consumptive losses that are known.

The Discharge Flow will calculate after Facility Flows data is entered:

- **Discharge Flow** – the sum of External Intake Flows + Stream Intake Flows minus Consumptive Losses

Stream Flows

- **Q7-10 Multipliers (Default Shown)** - Default Q7-10 multipliers are entered. If site-specific multipliers are available, the site-specific multipliers are entered here. Site-specific multipliers can be obtained by determining the Q7-10 for each time period.

- **Partial Mix Factor (PMF)** – The partial mix factor of the effluent with the stream. The default is 1.00 which is an assumption of complete mix. The entered value must be between 0 and 1, otherwise an error message will appear.

The Stream Flows will automatically populate after the Q7-10 is entered. Note that Stream Flows are also dependent on the Q7-10 Multipliers:

- **Seasonal Stream Flow (cfs)** – The Q7-10 flow adjusted using the Q7-10 multiplier.

- **Downstream Stream Flow (cfs**) – The Seasonal Stream Flow plus Intake Flows minus Consumptive losses, if any. If a PMF other than 1 was applied, the downstream flow rate will not be the entire flow of the stream downstream of the outfall.

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Temperature

- **Ambient Stream Temperature (°F)** – If known, enter the site-specific ambient stream temperatures above the discharge and intake, if applicable. The values must be between 0 °F and 180 °F, otherwise an error message will appear.

- **316a Criteria (°F)** – Maximum temperature values obtained as the result of a 316(a) temperature variance. 316(a) values must be reviewed and approved by DEP. The values must be between 0 °F and 180 °F.

NOTE: Default Ambient Stream Temperature data for WWF, CWF, and TSF streams should only be used if no information on stream temperature is available. The default ambient stream temperature and criteria used for an ORSANCO analysis is WWF but should only be used if no information on stream temperature is available. As an example, if a current permit holder monitors stream temperature, that data must be used over default data.

Calculate

- **CALCULATE button** – select this button once all of the data is entered and the Results worksheet will open.

Additional options

- **CLEAR FORM button** – will clear the data in the entered cells in the information and Facility Flows sections. The Q7-10 Multipliers and the PMF will be reset to default values.

Results Worksheets

Parameters are determined by the spreadsheet as follows:

- **Target Maximum Stream Temp. (°F)** - the maximum of the criteria value or 1 °F above ambient stream temperature if the ambient stream temperature is at or above the maximum criteria value. For ORSANCO, the Target Maximum Stream Temperature is the minimum of the ORSANCO criteria or the aforementioned maximum.

- **Case 1 Daily WLA (Million BTUs/day)** – The recommended heat rejection rate permit limits for Case 1 scenarios.

- **Case 2 Daily WLA (°F)** – The recommended temperature limits for Case 2 scenarios and Case 1 scenarios where a portion of the intake water is not from the receiving stream. Recommended limits will not be greater than 110 °F.

Additional options

- **Return to Inputs button** – returns the user to the Inputs worksheet.

- **Print to PDF button** – prints the Inputs and Results worksheets to a pdf file.

- **Print WWF/CWF/TSF/316a/ORSANCO button** – prints the Inputs and Results worksheets to the default printer.

Reference Worksheet

Warm Water Fishes (WWF), Cold Water Fishes (CWF) and Trout Stocking Fishes (TSF) criteria are prepopulated. This is the maximum temperature criteria from PA Code 25 Chapter 93.

For informational purposes, default Q7-10 multipliers and default ambient stream temperature values are shown.
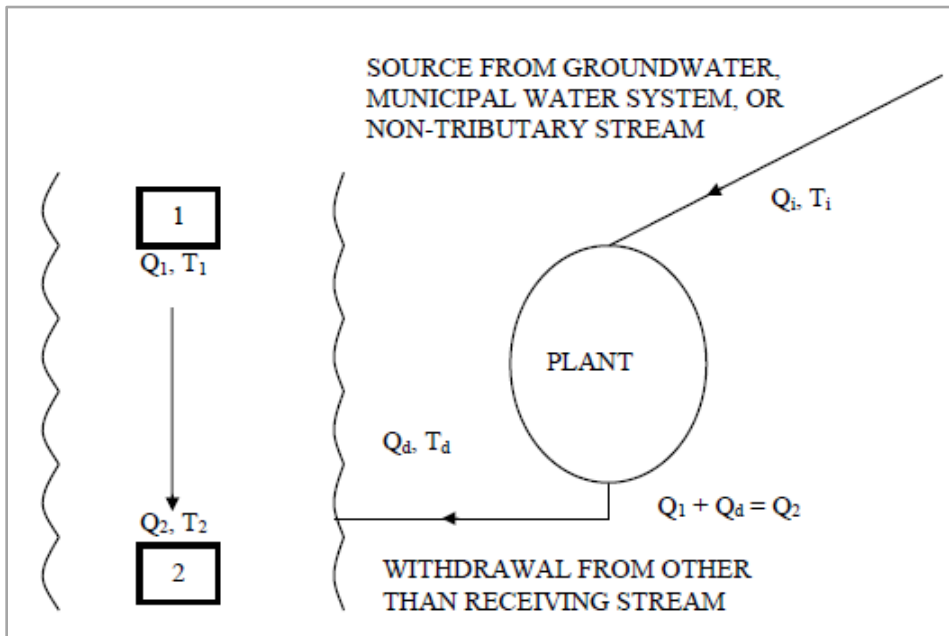
ATTACHMENT A

Case 1
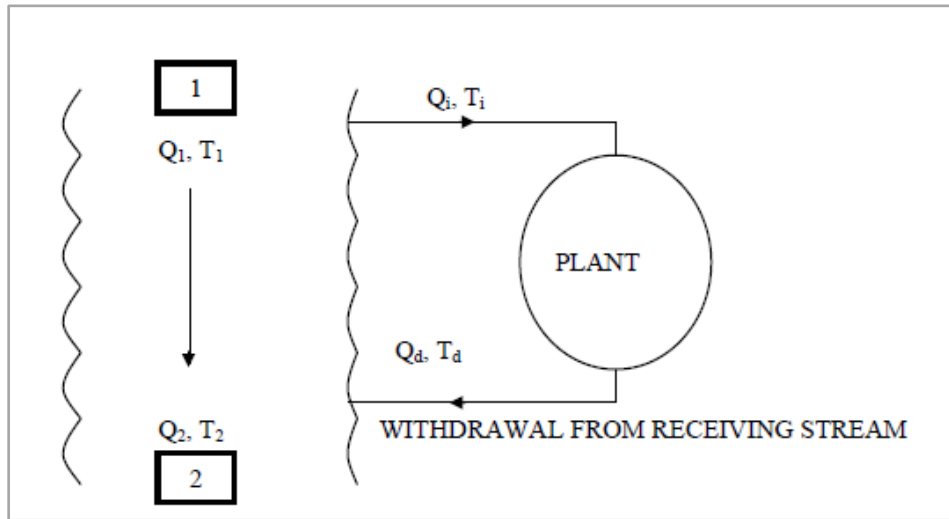
Case 2

Figure 1: Case 1 and case 2 scenarios

Additional Resources
DEP Implementation Guidance for Temperature Criteria (DEP-ID 386-2000-001)
DEP Anti-Degradation Policy (DEP-ID 391-0300-002)
DEP Implementation Guidance Design Conditions (DEP-ID 386-2000-007)

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Revision History

Date	Version	Revision Reason
4/2/2024	1.0	Original