

TOTAL ANNUAL POUNDS OF PHOSPHORUS

In the following pages you will find detailed instructions (with examples) for properly calculating Total Monthly Pounds of Phosphorus and Total Annual Pounds of Phosphorus. Permittees within the Lake Champlain drainage basin will be required to perform these calculations to satisfy conditions which will be set forth in each permit upon renewal.

This packet includes:

Page 2 – An example of a typical permit “Effluent Limits” page

Page 3 – Report Form WR-43-PO4

Page 4 – Example (partial) WR-43 Monthly report form including Flow + PO4

Page 5 – Detailed Calculation instructions

If you have problems or questions regarding this packet or any other laboratory issues, please don't hesitate to contact your regional wastewater staff. A map of Vermont regional wastewater districts, list of assigned staff, and contact information is available at: <http://dec.vermont.gov/watershed/wastewater/contacts>

I. SPECIAL CONDITIONS

A. EFFLUENT LIMITS

1. Until September 30, 2008, the permittee is authorized to discharge from S/N 001 - outfall, the Charleston Wastewater Treatment Facility, to the Moose River, an effluent whose characteristics shall not exceed the values listed below:

DISCHARGE LIMITATIONS								
Effluent Characteristic	Annual Limit	Monthly Average	Weekly Average	Maximum Day	Monthly Average	Weekly Average	Maximum Day	Instantaneous Maximum
	----- (lbs / day) -----				----- (Concentration) -----			
Flow (Annual Avg)	0.425 mgd							
Biochemical Oxygen Demand, 5-day, 20°C		106	160		30 mg/l	45 mg/l	50 mg/l	
Total Suspended Solids		106	160		30 mg/l	45 mg/l	50 mg/l	
Total Phosphorus (Total Annual Pounds)	776 lbs (1)				0.8 mg/l			
Settleable Solids								1.0 ml/l
Total Residual Chlorine						0.85 mg/l		1.5 mg/l
Escherichia coli Bacteria								77/100 ml
pH					Between 6.5 and 8.5 Standard Units			

(1) **Total Annual Pounds of Phosphorus** discharged shall be defined as the sum of all **Total Monthly Pounds of Phosphorus** discharged for the calendar year. **Total Monthly Pounds of Phosphorus** discharged shall be calculated as follows:

(Monthly Average Phosphorus Concentration) x (Total Monthly Flow) x 8.34. (See Total Phosphorus monitoring report form WR-43-PO4.)

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
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PHOSPHORUS MONITORING REPORT FORM WR-43-PO4

Permittee Name	
Permit Number	
Month / Year	

A	Monthly Average Phosphorus Concentration <i>(sum of all daily discharges (mg/l) measured during the month divided by the number of daily discharges measured during the month)</i>		mg/l
B	Total Monthly Flow <i>(sum of all daily flows for the entire month)</i>		million gallons
	Number of days flow was recorded		
C	Total <u>Monthly</u> Pounds of Phosphorus Discharged <i>(A x B x 8.34 = C)</i>		lbs
D	Total <u>Annual</u> Pounds of Phosphorus Discharged <i>(sum of all monthly total phosphorus pounds in this calendar year)</i>		lbs

Preparer/Contact Person	
Telephone Number	

	EXAMPLE #1	
	CHARLESTON WWTF	January-03
Date	FLOW (MGD)	TOTAL PHOS (mg/L)
1	0.300	0.7
2	0.300	
3	0.300	
4	0.300	
5	0.300	
6	0.300	
7	0.300	0.5
8	0.300	
9	0.300	
10	0.300	
11	0.300	
12	0.300	
13	0.300	
14	0.300	
15	0.300	
16	0.300	
17	0.300	0.7
18	0.300	
19	0.300	
20	0.300	
21	No Discharge	
22	No Discharge	
23	0.300	
24	0.300	
25	0.300	
26	0.300	
27	0.300	0.5
28	0.300	
29	0.300	
30	0.300	
31	0.300	
TOTAL	8.70 MG	2.4 mg/L
AVERAGE	0.300 MGD	0.6 mg/L
TOTAL MONTHLY PHOS		43.5 POUNDS

EXAMPLE 1 – “CHARLESTON”

STEP #1 – Calculate the **M**onthly **A**verage **P**hosphorus **C**oncentration (**MAPC**)

MAPC = sum of all daily discharges (mg/L) **measured** during the month divided by the number of daily discharges **measured** during the month

For Charleston:

$$\text{MAPC} = 0.7 \text{ mg/L} + 0.5 \text{ mg/L} + 0.7 \text{ mg/L} + 0.5 \text{ mg/L} = 2.4 \text{ mg/L}$$

$$\text{MAPC} = 2.4 \text{ mg/L} \div 4 =$$

STEP #2 – Calculate the **Total Monthly Flow**

Total Monthly Flow = Sum of all daily flows for the entire month.

For Charleston:

$$\text{Total Monthly Flow} = 0.300 + 0.300 + 0.300 + 0.300 \dots\dots$$

$$\text{Total Monthly Flow} = \quad \text{Note: there are only 29 days of discharge in our example}$$

STEP #3 – Calculate the **Total Monthly Pounds of Phosphorus Discharged**

$$\text{Total Monthly Pounds of Phosphorus} = (\text{step \#1}) \times (\text{step \#2}) \times 8.34$$

For Charleston:

$$\text{Total Monthly Pounds of Phosphorus} = 0.6 \text{ mg/L} \times 8.70 \text{ MG} \times 8.34 =$$

To Calculate the **TOTAL ANNUAL POUNDS OF PHOSPHORUS DISCHARGED** simply add all the Monthly Pounds of Phosphorus discharged in this calendar year.

TOTAL ANNUAL POUNDS OF PHOSPHORUS DISCHARGED = January lbs P + February lbs P + March lbs P

If the pounds of phosphorus results were the same for twelve months: (43.5 lbs)
in our example the total annual pounds of phosphorus discharged would be
522.4 pounds (well within the permitted limit)

0.6 mg/L

8.70 MG

43.5 pounds