

[For Public Water Systems]

**INSTRUCTIONS FOR COMPLETING THE SURFACE WATER TREATMENT PLANT
DISINFECTION, TURBIDITY (CFE, IFE) AND TOTAL ORGANIC CARBON
MONTHLY OPERATION REPORT
EPA FORM 5109 (9/10)**

PUBLIC WATER SYSTEM INFORMATION

PWS Name: Print or type name of public water system (PWS).
STU Name: Print or type source treatment unit (STU) name
PWSID #: Enter the PWS ID number.
STU #: Enter the STU ID number.

LABORATORY INFORMATION

Reporting Period: Enter month and year of the report.
Analytical Lab ID: Enter the laboratory ID number for the lab that performed the chlorine, turbidity, pH, temperature and alkalinity analysis.
Analytical Lab Name: Enter the name of the laboratory.

DISTRIBUTION DISINFECTANT REPORTING OAC 3745-81-70(E)(1), OAC 3745-83-01(G)(1)(2), OAC 3745-81-72(B)(4)

- (a) Enter the number of disinfectant samples analyzed during the reporting period.
- (b) Enter the number of disinfectant samples analyzed that had results below the minimum required residual level. The residual disinfectant concentration in distribution shall not be less than 0.2 mg/L free or 1.0 mg/L combined in more than 5% of the samples for any two consecutive months.

- (c) Enter the percent of disinfectant samples meeting the required residual level:

$$\frac{a-b}{a} \times 100 \quad \text{where} \quad \begin{array}{l} a = \text{number of samples analyzed and} \\ b = \text{number of samples below required residual.} \end{array}$$

- (d) Enter the percent of disinfectant samples that met the minimum disinfectant requirement in the previous month.

CLEARWELL INFORMATION

- (e) Circle/Select whether the CT calculation is simple or complex. A simple calculation involves one clearwell or multiple clearwells with identical water depths and identical values for pH, temperature and disinfectant. A complex calculation involves two or more clearwells with at least one dissimilar variable.
- (f) Circle/Select whether or not the disinfectant is monitored continuously (circular pen chart or 6 minute data logging). PWS > 3,300 population shall monitor and record residual disinfectant

concentration of the water entering the distribution system continuously. If there is a failure of the continuous disinfectant monitoring equipment, grab sampling every 4 hrs shall be conducted but continuous monitoring must be placed back on line in no more than 5 working days after the failure. PWS \leq 3,300 population, with acceptance from the director, may take four hour grab samples in lieu of continuous monitoring. Systems taking grab samples must monitor disinfectant residual at least every four hours unless the high service pumps are locked out for a portion of the day. If the pumps are locked out for a portion of the day, samples must be taken during the first and last hours of pump operations, and every four hours in between.

If chloramines are utilized in the distribution system, the continuous analyzer should monitor combined chlorine residual (typically requires the simultaneous monitoring of free and total chlorine residuals) otherwise the continuous analyzer should measure free chlorine.

- (g) Circle/Select the filtration type: conventional, slow sand or direct filtration. If your plant has an alternative filtration type such as microfiltration or ultrafiltration membranes, circle the conventional filtration type. OAC Rule 3745-81-73 (C) requires alternative treatment technologies to meet the requirements of a conventional filtration treatment system.
- (h) Enter the log inactivation required.
 - Conventional (0.5)
 - Slow sand (1.0)
 - Direct filtration (1.0)
 - Other approved requirement
- (i) Enter the Clearwell ID
- (j) Enter the Clearwell surface area (sq ft) or cylindrical/pipe diameter (inches) and
- (k) Enter the approved effective volume factor of each clearwell.

DATA FIELD DESCRIPTIONS FOR DISINFECTION ANALYTICAL INFORMATION (For CT calculation examples, see pgs 8-11).

- (l) Free/Combined. Report the lowest free or combined chlorine residual (mg/L) in the water entering the distribution system for each day.

If chloramines are utilized in the distribution system, report the lowest combined chlorine residual. Otherwise, report the lowest free chlorine residual. It is only necessary to report either free or combined chlorine residual depending upon whether chloramines or free chlorine is utilized in the distribution system.

- (m) Duration Chlorine Residual Fell Below Requirement: Enter the duration of time (to the nearest 0.1 hour) that the residual disinfectant fell below the requirement of 0.2 mg/L free or 1.0 mg/L combined. The residual disinfectant concentration in the water entering the distribution system shall not be less than 0.2 mg/L free chlorine or 1 mg/L combined chlorine for more than four consecutive hours.
- (n) Peak Hourly Treatment Flow: Enter the peak hourly treatment flow (maximum treated water flow) in gallons per minute (gpm) for each day. Peak hourly flow should be total treated water flow, **NOT** high service pumping rate, unless there is no other way to measure total flow. Contact your district office for additional guidance.

- (o) Highest pH. Enter the highest recorded pH measured during the peak hourly flow for the treated water for each day.
- (p) Lowest Temp. Enter the lowest temperature in Celsius measured during the peak hourly flow for each day collected at the residual disinfectant concentration sampling point. [$^{\circ}\text{C} = (^{\circ}\text{F} - 31) / 1.8$]
- (q) Lowest Clearwell Operating Depth/Level: If only one clearwell is used or if two or more clearwells are used and the CT calculation is simple (identical values for water depth, temperature, pH and chlorine residual in all clearwells), enter the lowest operating depth/level (ft) during peak hourly flow. If two or more clearwells are used and the CT calculation is complex, then leave this column blank and report the clearwell ID and the lowest operating level/depth during peak hourly flow (i.e., #1-26 ft, #2-30 ft) in the 'Comments' column. If temperature, pH or chlorine residual also vary between clearwells, include this information for each clearwell.
- (r) Lowest Disinfectant Concentration: Enter the lowest disinfectant concentration of the clearwell effluent in mg/L during the peak hourly flow for each day.
- (s) Effective Disinfectant...Enter the effective disinfectant contact time (minutes) the disinfectant was in contact with the water.

$$\frac{[\text{clearwell surface area (sqft)(i)} \times \text{lowest clearwell depth (g)} \times \text{approved effective volume factor(k)} \times 7.48]}{\text{peak hourly flow (n)}}$$

- (t) Minimum Actual CT. Enter the minimum actual CT value (minutes x mg/L) achieved during peak hourly flow [(r) x (s)]. When the peak flow rate lasts more than 1 hour, select the concurrent pH, temperature, clearwell depth/level, and disinfectant concentration which results in the lowest minimum actual CT value.
- (u) Required CT. Enter the required CT value (minutes x mg/L) necessary to provide adequate disinfection (from CT Tables in OAC 3745-81-72). Without interpolation use the table that has the nearest but lowest temperature recorded at the peak hourly flow, then the higher pH, and the higher residual disinfectant concentration.
- (v) Interpolation. Enter a "Y" if interpolation of CT values was performed.
- (w) Raw Alkalinity. Enter the raw alkalinity.
- (x) Raw TOC. Enter the raw TOC. If the raw TOC level is less than detection, enter only the detection limit (i.e., if the detection level is <1, enter 1).
- (y) Finished TOC. Enter the finished TOC. If the finished TOC level is less than detection, enter only the detection limit (i.e., if the detection level is <1, enter 1).
- (z) Comments. Add any comment here. For example, if more than one clearwell is used on any given day, indicate which were in operation. Additionally, if the water depths are not equal, report the corresponding depths during the peak hourly flow. [See instruction (q)].

TOC VALUE INFORMATION OAC 3745-81-77 (Enter the laboratory certification number in the comments section for the lab that analyzed the following parameters: TOC and any ATC samples i.e., TOC- Chem-8000, SUVA-Chem-8001; or TOC, SUVA- Chem-8000)

TOC reporting applies to surface water community and surface water non-transient non-community public water systems using conventional filtration. TOC reporting does not apply to surface water transient non-community public water systems.

<u>TOC Value Information</u>	
Calculated TOC Value	ATC (1.0)
(aa)	A, B, C, D, E, None (bb)

(aa) Calculated TOC Value

Calculate the monthly total organic carbon (TOC) value based on monitoring results for TOC. Refer to the explanation and example calculation below.

Every thirty days, collect samples for raw source alkalinity (prior to any chemical application), raw source TOC (prior to any chemical application) and treated TOC. Collect the treated TOC sample at the combined filter effluent (CFE). The raw source TOC and the treated TOC samples are “paired” samples meaning the sample collections should be timed such that the treated TOC sample is collected after the source TOC water has traveled through the plant to the CFE (approximate time).

EXAMPLE - TOC compliance calculation.

Source Total Alkalinity: 65 mg/L
 Raw Source TOC: 4 mg/L
 Treated Water TOC: 2.5 mg/L

Step 1: Calculate the percent TOC removed through the treatment process:

$$\frac{[(\text{Raw Source TOC}) - (\text{Treated Water TOC})]}{[\text{Raw Source TOC}]} \times 100 = \text{Percent TOC removed}$$

$$\frac{[4 \text{ mg/L} - 2.5 \text{ mg/L}]}{[4 \text{ mg/L}]} \times 100 = 37.5\% \text{ TOC removed}$$

Note: If the treated water TOC level is greater than the source water TOC level, enter a negative value for the percent TOC removed.

If the source water TOC level is less than 2.0 mg/L, you may use the Alternative TOC Compliance Criteria (ATC) described in the ATC Table on page 5. If the source water TOC level is 2.0 or greater, go to Step 2 to determine the percentage removal required.

Step 2: Determine the percentage of TOC removal required from the table below: OAC 3745-81-77(F).

	Source Water Alkalinity, mg/L as CaCO ₃		
Source Water TOC mg/L	0-60	> 60-120	> 120 ¹
≥ 2.0 - 4.0	35%	25%	15%
> 4.0 - 8.0	45%	35%	25%
> 8.0	50%	40%	30%

¹ - Systems practicing softening must meet the TOC removal requirements in this column.

Step 3: Calculate the TOC value for each paired sample by dividing the actual percentage of TOC removed by the required percentage to be removed:

$$\frac{37.5\% \text{ TOC (actually removed)}}{25\% \text{ TOC (removal required)}} = \text{TOC value } 1.5$$

Step 4: Report the calculated TOC value (aa) in the first column of the TOC Value Information box.

Note that if either the raw or the finished TOC level is less than detection, enter "0" in the Calc. TOC Value box.

Note that if more than one paired sample is collected in a month, the TOC value is the average of all the TOC values for all the individual paired samples.

(bb) Alternative TOC Compliance Criteria

Alternative TOC Compliance Criteria (ATC) can be used to comply with rule OAC 3745-81-77 if the source water TOC is less than 2.0 or if the TOC value is less than 1.0. Any one of the compliance criterion below, if met, is assigned a TOC value of 1.0. Select ATC code A, B, C, D or E, if used or circle/select "None".

Alternative TOC Compliance Criteria Table

CODE	Alternative TOC Compliance Criteria (ATC)
A	In any month that the treated or source water TOC level, measured according to rule OAC 3745-81-27, is less than 2.0 mg/L, a monthly value of 1.0 may be reported. Also, if either the raw or finished TOC level is less than detection, a monthly value of 1.0 may be reported.
B	In any month where a system practicing softening removes at least 10 mg/L magnesium hardness (as CaCO ₃), a monthly value of 1.0 may be reported.
C	In any month that the finished water SUVA*, measured according to rule OAC 3745-81-27, is < or = 2.0 L/mg-m, a monthly value of 1.0 may be reported.
D	In any month that the source water SUVA*, measured according to rule OAC 3745-81-27, is < or = 2.0 L/mg-m, a monthly value of 1.0 may be reported.
E	In any month the system is practicing enhanced softening and lowers the alkalinity below 60 mg/L (as CaCO ₃), a monthly value of 1.0 may be reported.

* SUVA is Specific Ultra Violet Absorption

Note: Records of all ATC sample results, must be kept on file and available for review. The record retention requirement is 12 years. Systems with an Ohio EPA approved removal percentage based on step 2 jar testing in accordance with OAC 3745-81-77(F)(3) thru (9), must keep this information on file and available for review.

TURBIDITY REPORTING INFORMATION OAC 3745-81-74

- (cc) Turbidity Location: Select the Ohio EPA accepted turbidity sampling location used at the plant. Acceptable locations are:
- (1) Combined filter effluent prior to entry into the clearwell; or
 - (2) Average of measurements from each individual filter effluent if each filter has essentially the same loading rate; or
 - (3) Clearwell effluent; or
 - (4) Plant effluent or immediately prior to entry into the distribution system.
- (dd) Total Hours Filtering: Enter the total number of hours water was filtered for each day.
- (ee) Total: Record the total number of hours (to the nearest 0.1 hour) the plant filtered water
- (ff) Maximum Turbidity: Enter the maximum turbidity value (NTU), to two decimal places, for each day.
- (gg) Max: Record the maximum turbidity value, to two decimal places, for the month
- (hh) Minimum Turbidity: Enter the minimum turbidity value (NTU), to two decimal places, for each day.
- (ii) Average Turbidity: Enter the average of all turbidity values (NTU), to two decimal places, for each day.

Grab Sample Report OAC 3745-81-74(A).

Systems monitoring at locations 1 or 2 shall monitor within the first and last hours of filter operations and every four hours in-between.

Systems monitoring at locations 3 or 4 shall monitor turbidity at least every four hours unless the high service pumps are locked out for a portion of the day. If the pumps are locked out for a portion of the day, samples shall be taken during the first and last hours of pump operations, and every four hours in-between.

- (jj) Total Number of Results: Enter the number of filtered water grab sample turbidity results collected each day.
- (kk) Total (Number of Results): Record the total number of turbidity values for the month.
- (ll) Number of Results Exceeding Standard. Enter the total number of filtered water grab samples exceeding the 0.3 NTU turbidity standard for conventional/direct/alternative treatment systems and the 1 NTU turbidity standard for slow sand systems for each day. To see which values exceed these standards, refer to Appendix C: Procedure for Determining Compliance with

Turbidity Standards.

(mm) Total (Number Exceeding Standard): Record the total number of turbidity values for the month that exceeded the 0.3 NTU standard for conventional/direct/alternative treatment systems and the 1 NTU standard for slow sand systems.

Continuous Monitoring Report

The system may substitute continuous monitoring for grab sample monitoring if the system validates the continuous measurement for accuracy on a daily basis using a protocol accepted by the Director. Continuous recording shall also be provided.

Note: Systems monitoring at locations 1 or 2 shall report during hours of filter operations. Systems monitoring at locations 3 or 4 shall report results 24 hours a day unless the high service pumps are locked out for a portion of the day.

(nn) Number of Hours Results were Recorded: Enter the total number of hours that filtered water turbidity was monitored by a continuous monitoring device for each day (to the nearest 0.1 of an hour).

(oo) Total (Number of Hours Results Recorded): Record the total number of hours (to the nearest 0.1 hour) that turbidity values were measured for the month.

(pp) Number of Hours Results Exceeded Standard: Enter the total number of hours that filtered water turbidity results exceeded the 0.3 NTU standard for conventional/direct/alternative treatment systems and the 1 NTU standard for slow sand systems for each day (to the nearest 0.1 of an hour). To see which values exceed these standards, refer to Appendix C: Procedure for Determining Compliance with Turbidity Standards.

(qq) Total (Number of Hours Exceeded Standard): Record the total number of hours (to the nearest 0.1 hour) for the month in which turbidity values exceeded the 0.3 NTU standard for conventional/direct/alternative treatment systems and the 1 NTU standard for slow sand systems. To see which values exceed these standards, refer to Appendix C: Procedure for Determining Compliance with Turbidity Standards.

Calculating Percent Within Standard

(rr) Percent within Standard: Enter the percent of turbidity samples that were within the standard of equal to or less than 0.3 NTU for conventional/direct/alternative treatment systems and equal to or less than 1 NTU for slow sand systems. (Percentage of hours turbidity was not exceeded). To see which values exceed these standards, refer to Appendix C: Procedure for Determining Compliance with Turbidity Standards.

For Grab Sampling:

$$\frac{(\text{total number of results}) - (\text{total number of results exceeding standard})}{(\text{total number of results})} \times 100$$

For Continuous Monitoring:

$$\frac{(\text{total number hours filtering}) - (\text{total number hours results exceeded standard})}{(\text{total number of hours})} \times 100$$

Results Exceeding Standard

(To see which values exceed the standard, refer to Appendix C: Procedure for Determining Compliance with Turbidity Standards.)

- (ss) Date: Enter the date that the particular turbidity result exceeded the 0.3 NTU standard for conventional/direct/alternative treatment systems and the 1 NTU standard for slow sand systems.
- (tt) Time: Enter the time that the particular turbidity result exceeded the 0.3 NTU standard for conventional/direct/alternative treatment systems and the 1 NTU standard for slow sand systems in military time format (00:00:00 – 23:59:59).
- (uu) Turbidity: Enter the actual turbidity value (NTU) to two decimal places.
- (vv) Duration: Enter the duration in hours (to the nearest 0.1 hour) that turbidity exceeded the 0.3 NTU standard for conventional/direct/alternative treatment systems and the 1 NTU standard for slow sand systems.

Turbidity values that have been determined, but are not required to be reported on this form, are required to be kept and made available for inspection upon request. The record retention requirement for these analyses is 12 years.

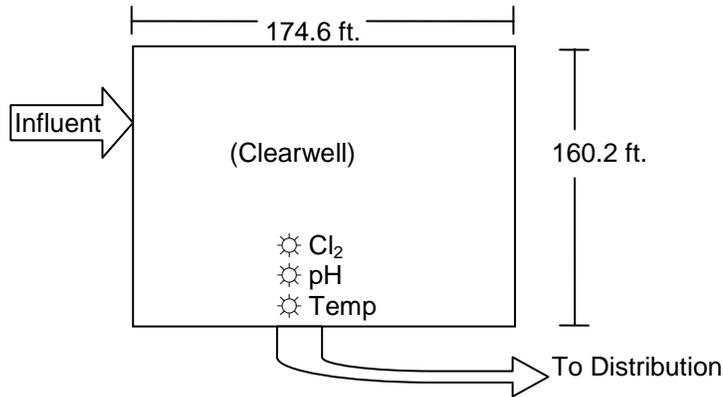
Report Certification

- (ww) Signature: Operator of Record (ORC) must sign report.
- (xx) Certification number: Print the ORC's Certification number.
- (yy) Date: Print the date the report was completed.

The monthly operating report is to be submitted to Ohio EPA by the tenth day of the following month.

EXAMPLE CT CALCULATION #1

SIMPLE CALCULATION - 1 clearwell with an Approved Effective Volume Factor of 0.2



NOTE: All areas must be in square feet, and all flow rates must be in gallons per minute.

During Peak Hourly Flow:

Free chlorine concentration of clearwell effluent:	1.1 mg/L
Water temperature of clearwell effluent:	8°C
Water depth in clearwell:	17.5 feet
pH of clearwell effluent:	8.2
Peak hourly flow:	12,490 gpm

NOTE: Peak hourly flow is total treated water flow, **NOT** high service pumping rate!

STEP 1. Calculate the Surface Area of Clearwell

$$A = (160.2 \times 174.6)$$
$$A = 27,970 \text{ sq. ft.}$$

STEP 2 Calculate Effective Contact Time (T)

$$T = \frac{(\text{Effective Volume Factor}) \times (\text{Surface Area}) \times (\text{Minimum Clearwell Level}) \times (7.48)}{\text{Peak Hourly Flow}}$$

$$T = \frac{0.2 \times 27,970 \times 17.5 \times 7.48}{12,490}$$

$$T = 58.627 \text{ minutes}$$

$$T = 59 \text{ minutes (rounded)}$$

STEP 3 Calculate the Actual CT Value during the Peak Hourly Flow

$$CT = (\text{Free chlorine concentration of clearwell effluent}) \times (\text{Contact Time})$$

$$CT = 1.1 \text{ mg/L} \times 59 \text{ min}$$

$$CT = 64.9 \text{ mg/L} - \text{min}$$

$$CT = 65 \text{ (rounded)}$$

STEP 4 Determine the Required CT Value

Temperature of clearwell effluent	8°C
pH of clearwell effluent	8.2
Free Chlorine Concentration of clearwell effluent	1.1 mg/l
Disinfection for Log Inactivation Required	
for Conventional Filtration	0.5
for Direct or Slow Sand Filtration	1.0

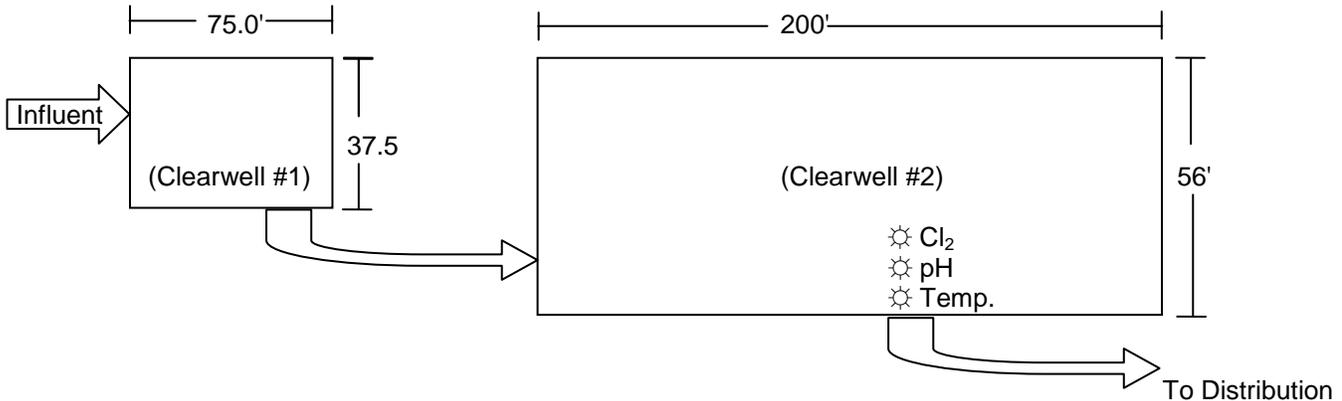
Note: Temperature is rounded down to 5°C, pH is rounded up to 8.5, chlorine residual is rounded up to 1.2 alternatively, results may be interpolated from the tables.

CHLORINE CONCENTRATION (mg/l)	5°C		pH = 8.5			
	Log Inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	39	79	118	157	197	236
0.6	41	81	122	163	203	244
0.8	42	84	126	168	210	252
1.0	43	87	130	173	217	260
1.2	45	89	134	173	223	267
1.4	46	91	137	183	228	274
1.6	47	93	141	187	234	281
1.8	48	96	144	191	239	287
2.0	49	98	147	196	245	294
2.2	50	100	150	200	250	300
2.4	51	102	153	204	255	306
2.6	52	104	156	208	260	312
2.8	53	106	159	212	265	318
3.0	54	108	162	216	270	324

The required CT value is 45 for Conventional Filtration.
The required CT value is 89 for Direct or Slow Sand Filtration.

EXAMPLE CT CALCULATION #2

Complex Calculation - 2 clearwells with different Approved Effective Volume Factors and different clearwell levels.



Approved Effective Volume Factors

Clearwell # 1 - 0.1

Clearwell # 2 - 0.6

During Peak Hourly Flow:

Free chlorine concentration of clearwell effluent#2 1.1 mg/L

Water temperature of clearwell effluent #2 8°C

Minimum Water depth in clearwells

Clearwell # 1 8 feet

Clearwell # 2 10 feet

pH of clearwell effluent #2 8.2

Peak hourly flow 4,150 gpm

NOTE: Peak Hourly Flow is total treated water flow, NOT high service pumping rate!

STEP 1. Calculate the Surface Area (A) of each Clearwell

Clearwell # 1	$A_1 = 37.5 \times 75$	Clearwell # 2	$A_2 = 56 \times 200$
	$A_1 = \mathbf{2,813 \text{ sq. ft.}}$		$A_2 = \mathbf{11,200 \text{ sq. ft.}}$

STEP 2. Calculate Effective Contact Time (T) for each clearwell.

$$T = \frac{(\text{Effective Volume Factor}) \times (\text{Surface Area}) \times (\text{Minimum Clearwell Level}) \times 7.48}{\text{Peak Hourly Flow}}$$

Clearwell #1 $T_1 = \frac{0.1 \times 2,813 \times 8 \times 7.48}{4,150}$	Clearwell # 2 $T_2 = \frac{0.6 \times 11,200 \times 10 \times 7.48}{4,150}$
--	---

$T_1 = 4.056 \text{ minutes}$	$T_2 = 121.121 \text{ minutes}$
$T_1 = \mathbf{4 \text{ minutes}}$ (rounded)	$T_2 = \mathbf{121 \text{ minutes}}$ (rounded)

STEP 3. Calculate the Total Effective Contact Time (Tt)

$$T_t = T_1 + T_2$$

$$T_t = 4 + 121 = 125 \text{ minutes}$$

STEP 4. Calculate the Actual CT Value During the Peak Hourly Flow

$$CT = (\text{Free chlorine concentration of clearwell effluent}) \times (\text{Contact Time})$$

$$CT = 1.1 \text{ mg/L} \times 125 \text{ min}$$

$$CT = 137.5 \text{ mg/L} \cdot \text{min}$$

$$CT = 138 \text{ (rounded)}$$

STEP 5. Determine the Required CT Value

Water Temperature at clearwell effluent #2	8°C
pH at clearwell effluent #2	8.2
Free Chlorine Concentration at clearwell effluent #2	1.1 mg/L
Disinfection for Log Inactivation Required	
for Conventional Filtration	0.5
for Direct or Slow Sand Filtration	1.0

Temperature is rounded down to 5°C, pH is rounded up to 8.5, chlorine residual is rounded up (alternatively, results may be interpolated from the tables).

CHLORINE CONCENTRATION (mg/l)	5°C		pH = 8.5			
	Log Inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0
<=0.4	39	79	118	157	197	236
0.6	41	81	122	163	203	244
0.8	42	84	126	168	210	252
1.0	43	87	130	173	217	260
1.2	45	89	134	173	223	267
1.4	46	91	137	183	228	274
1.6	47	93	141	187	234	281
1.8	48	96	144	191	239	287
2.0	49	98	147	196	245	294
2.2	50	100	150	200	250	300
2.4	51	102	153	204	255	306
2.6	52	104	156	208	260	312
2.8	53	106	159	212	265	318
3.0	54	108	162	216	270	324

The required CT value is 45 for Conventional Filtration.
 The required CT value is 89 for Direct or Slow Sand Filtration.

**INSTRUCTIONS FOR COMPLETING THE ADDENDUM FOR INDIVIDUAL
FILTER TURBIDITY RESULTS MONTHLY OPERATING REPORT (MOR)
IESWTR SYSTEMS $\geq 10,000$ POPULATION**

GENERAL

Each public water system that uses a surface water source, in whole or in part, and provides water to a combined population of at least ten thousand, shall continuously monitor the turbidity from each individual filter effluent (IFE). Each public water system required to conduct individual filter turbidity monitoring shall report monthly that IFE turbidity monitoring has been conducted. These same public water systems shall record the results of each individual filter turbidity monitoring every fifteen minutes. The results of the recorded measurements shall be used to determine whether the public water system had an individual filter turbidity exceedance during the month*. The water system shall also report on a monthly basis, any individual filter turbidity exceedances and the status of all “actionable requirements.” The individual turbidity exceedances and actionable requirements are listed below.

INDIVIDUAL FILTER TURBIDITY PERFORMANCE STANDARDS	
Individual Filter Event (IFE)	Action Required
<p><u>OTHER</u> Any IFE equipment failure where turbidity was not monitored or recorded every 15 minutes.</p>	<ul style="list-style-type: none"> Report the filter number, IFE ‘Other’, date and time of the occurrence and the duration/grab sampling frequency into the “Turbidity or Duration/Frequency” column of the table
<p><u>EVENT A</u> Any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart</p>	<ul style="list-style-type: none"> Report the filter number, IFE ‘A’, date, time and turbidity measurements during which the exceedances occurred. Complete a filter profile within 7 days of the exceedance (if not able to identify an obvious reason for the abnormal filter performance) Report that a filter profile has been produced or report the obvious reason for the exceedance.
<p><u>EVENT B</u> Any individual filter that has a measured turbidity level of greater than 0.5 NTU in two consecutive measurements taken 15 minutes apart at the end of the first four hours of continuous filter operation after the filter has been backwashed or otherwise taken offline</p>	<ul style="list-style-type: none"> Report the filter number, IFE ‘B’, date, time and turbidity measurements during which the exceedances occurred. Complete a filter profile within 7 days of the exceedance (if not able to identify an obvious reason for the abnormal filter performance) Report that the filter profile has been produced or report the obvious reason for the exceedance
<p><u>EVENT C</u> Any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive months</p>	<ul style="list-style-type: none"> Report the filter number, IFE ‘C’, date, time and turbidity measurements during which the exceedances occurred. Complete an individual filter self-assessment within 14 days of the exceedance. Report that an individual filter self-assessment was conducted.
<p><u>EVENT D</u> Any individual filter that has a measured turbidity level of greater than 2.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of two consecutive months</p>	<ul style="list-style-type: none"> Report the filter number, IFE ‘D’, the date, time and turbidity measurements during which the exceedances occurred. Arrange for the completion of a comprehensive performance evaluation (CPE) by the Ohio EPA or a third party no later than 30 days following the exceedance. Must contact the Ohio EPA before arranging a third party CPE. Have the CPE completed and submitted to the Ohio EPA no later than 90 days following the exceedance.

* To see which values are considered to be exceedances of the standards, refer to Appendix C: Procedure for Determining Compliance with Turbidity Standards.

GUIDELINES

The completed form entitled "Addendum for Individual Filter Turbidity Results Monthly Operation Report", must be submitted each month. In addition to reporting that monitoring was conducted, and the results of the required IFE turbidity monitoring that constitutes an exceedance are required to be entered on the Addendum. The status of all incomplete "actionable requirements" are also required to be reported on the Addendum.

INDIVIDUAL FILTER EVENT INFORMATION

The individual filter events are 'Other', A, B, C and D. For each of the individual filter events listed, record whether or not any of the individual filters had an individual filter exceedance as described in A, B, C and D. Or, record 'Other' in the event of an equipment failure resulting in a failure to monitor or record IFE turbidity levels at least every 15 minutes. If any of the answers for 'Other', A, B, C or D are "Yes", then complete the table as appropriate.

To fill out the table, in the first column enter the number of the filter that had an exceedance followed by the event which was triggered A, B, C, D or 'Other' (for failure to monitor or record) in the second column. In the third column enter the dates of each turbidity exceedance and then enter the times of each turbidity exceedance in the fourth column. Finally, enter the turbidity measurements to two decimal points which triggered the event.

EXAMPLE:

Filter Number	Individual Filter Event (Other, A, B, C, D)	Date	Time	Turbidity or Duration/Frequency
5	A	2/5/09	5:00 am	1.21
5	A	2/5/09	5:15 am	1.35
7	C	2/14/09	2:30 pm	1.18
7	C	2/14/09	2:45 pm	1.14
4	Other	2/21/10	7:30 am	3days/4hr grabs

Below the table, record whether or not an individual filter event (A, B, C or D) was reported on the Addendum which was submitted last month for any of the filters listed in the table. For the example above, the answer would be 'yes'. EVENT C only occurs after exceeding a turbidity standard for three consecutive months. For Filter No. 7 to be recorded as EVENT C, Filter No. 7 would have been reported as having an EVENT A during the previous two months. In the third consecutive month of exceeding 1.0 NTU in two consecutive measurements taken 15 minutes apart, EVENT A would change to EVENT C.

REQUIRED FOLLOW-UP ACTIONS

If a filter profile, individual filter self-assessment, or comprehensive performance evaluation is required, complete the appropriate questions.

FILTER PROFILE:

- Record whether or not the required filter profile was completed within 7 days from the individual filter event. If No, provide a separate sheet with an explanation for why a profile was not completed.

Appendix A: Surface Water Treatment Plant Addendum A for Population \geq 10,000

INDIVIDUAL FILTER SELF-ASSESSMENT (IFSA):

- Record whether or not the required IFSA was completed within 14 days from the individual filter event.
- Record the completion date for the IFSA.

Please refer to the fact sheet for conducting Individual Filter Self-Assessments which can be downloaded from:

http://www.epa.ohio.gov/portals/28/documents/engineering/LT1_Conducting_IFSA.pdf

COMPREHENSIVE PERFORMANCE EVALUATION (CPE):

- Record the number of the filter that experienced the event that required a CPE to be completed.
- Record the date (*2nd consecutive month date*) of the event that required a CPE to be completed.
- Record the date your public water system contacted the Ohio EPA central office to arrange for an Ohio EPA conducted CPE or the dates third party CPE approval was requested from and granted by the Director.
- For third party CPE's, record the date your public water system submitted the final CPE report to the Ohio EPA District Office.
- Record whether or not the required CPE was arranged within 30 days of individual filter event (*2nd consecutive month date*).
- Record whether or not the required CPE report was submitted within 90 days of individual filter event (*2nd consecutive month date*).

Please refer to the fact sheet for conducting comprehensive performance evaluations which can be downloaded from:

http://www.epa.ohio.gov/portals/28/documents/engineering/LT1_Conducting_CPE.pdf

The completed Addendum must be submitted along with the Surface Water Monthly Operating Report.

**INSTRUCTIONS FOR COMPLETING THE ADDENDUM FOR INDIVIDUAL
FILTER TURBIDITY RESULTS MONTHLY OPERATION REPORT (MOR)
LT1 SWTR SYSTEMS, <10,000 POPULATION**

GENERAL

Each public water system that uses a surface water source, in whole or in part, and provides water to a combined population of less than ten thousand shall continuously monitor the turbidity from each individual filter effluent (IFE) (or combined filter effluent for systems with two filters). Each public water system shall report monthly that IFE turbidity monitoring has been conducted. These same public water systems shall record the results of each individual filter effluent turbidity monitoring every 15 minutes. The results of the recorded measurements shall be used to determine whether the public water system had an individual filter turbidity exceedance during the month*. The water system shall also report on a monthly basis, any individual filter turbidity exceedance, and the status of all “actionable requirements.” The individual turbidity events and actionable requirements are listed below.

INDIVIDUAL FILTER TURBIDITY PERFORMANCE STANDARDS	
Individual Filter Event (IFE)	Action Required
<p><u>OTHER</u> Any individual filter effluent (or combined filter effluent) equipment failure where turbidity was not monitored or recorded every 15 min.</p>	<ul style="list-style-type: none"> Report the filter number, IFE ‘Other’, date and time of the occurrence and the duration/grab sampling frequency into the “Turbidity or Duration/Frequency” column of the table
<p><u>EVENT A</u> Any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart</p>	<ul style="list-style-type: none"> Report the filter number, IFE ‘A”, date, time and turbidity measurements during which the exceedance occurred. Report reason for the exceedance, if known.
<p><u>EVENT B</u> Any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive months</p>	<ul style="list-style-type: none"> Report the filter number, IFE ‘B’, date, time and turbidity measurements during which the exceedances occurred. Complete an individual self-assessment within 14 days of the exceedance. Report that an individual filter self-assessment was conducted.
<p><u>EVENT C</u> Any individual filter that has a measured turbidity level of greater than 2.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of two consecutive months</p>	<ul style="list-style-type: none"> Report the filter number, IFE ‘C’, date, time and turbidity measurements during which the exceedances occurred. Arrange for the completion of a comprehensive performance evaluation (CPE) by the Ohio EPA or a third party no later than 60 days following the exceedance. Must contact the Ohio EPA before arranging a third party CPE. Have the CPE completed and submitted to the Ohio EPA no later than 120 days following the exceedance.

* To see which values are considered to be exceedances of the standards, refer to Appendix C: Procedure for Determining Compliance with Turbidity Standards.

GUIDELINES

A completed form entitled "Addendum for Individual Filter Turbidity Results Monthly Operation Report" must be submitted each month. In addition to reporting that IFE monitoring was conducted, the results of the required individual filter effluent turbidity monitoring that constitutes an individual filter event are required to be entered on the Addendum. The status of all incomplete "actionable requirements" are also required to be reported on the Addendum.

INDIVIDUAL FILTER EVENT INFORMATION

The individual filter events are 'Other', A, B, and C. For each of the individual filter events listed, record whether or not any of the individual filters (or combined filter effluent for systems with two filters) had an individual filter turbidity exceedance as described in A, B, and C. Or, record 'Other' in the event of an equipment failure resulting in a failure to monitor or record IFE turbidity levels at least every 15 minutes. If any of the answers for 'Other', A, B, and C are "Yes", then complete the table as appropriate.

To fill out the table, in the first column enter the number of the filter that had an exceedance followed by the event which was triggered A, B,C or 'Other' (for failure to monitor or record) in the second column. In the third column, enter the dates of each turbidity exceedance and then enter the times of each turbidity exceedance in the fourth column. Finally, enter the turbidity measurements, to two decimal points, which triggered the event.

EXAMPLE:

Filter Number	Individual Filter Event (Other,A, B, C)	Date	Time	Turbidity or Duration/Frequency
5	B	4/5/09	4:00 pm	1.38
5	B	4/5/09	4:15 pm	1.45
3	Other	4/17/09	7:45 am	3days/4hr grabs

Below the table on the form, record whether or not an individual filter event (A, B, or C) was reported on the Addendum which was submitted last month for any of the filters listed in the table. For the example above, the answer would be "yes". EVENT B only occurs after exceeding a turbidity standard for three consecutive months. For Filter No. 5 to be recorded as EVENT B, Filter No. 5 would have been reported as having an EVENT A during the previous two months. In the third consecutive month of exceeding 1.0 NTU in two consecutive measurements taken 15 minutes apart, the EVENT A would change to EVENT B.

REQUIRED FOLLOW-UP ACTIONS

If an individual filter self-assessment or comprehensive performance evaluation is required, complete the appropriate questions listed below the table on the form.

INDIVIDUAL FILTER SELF-ASSESSMENT (IFSA):

- Record whether or not the required IFSA was completed within 14 days from the individual filter event.
- Record the completion date for the IFSA.

Appendix B: Surface Water Treatment Plant Addendum B for Population < 10,000

- Please refer to the fact sheet for conducting individual filter self-assessments which can be downloaded from the Ohio EPA Website.

COMPREHENSIVE PERFORMANCE EVALUATION (CPE):

- Record the number of the filter that experienced the event that required a CPE to be completed.
- Record the date (2nd consecutive month date) of the event that triggered the requirement to conduct a CPE.
- Record the date when your public water system finalized a date for conducting the CPE (not the date of the CPE). This will be the date you contacted the Ohio EPA District Office to arrange for an Ohio EPA conducted CPE or the date you contacted the Ohio EPA District Office to request that the CPE be conducted by a third party.
- For third party CPE's, record the date your public water system submitted the final CPE report to the Ohio EPA District Office.
- Record whether or not the required CPE was arranged within 60 days of individual filter event (2nd consecutive month date).
- Record whether or not the required CPE report was submitted within 120 days of individual filter event (2nd consecutive month date).
- Please refer to the fact sheet for conducting comprehensive performance evaluations which can be downloaded from the Ohio EPA Website

The completed Addendum must attached to the Surface Water Monthly Operating Report.

Appendix C: Procedure for Determining Compliance with Turbidity Standards

Follow these steps to determine compliance with the turbidity standards:

1. Report the turbidity value on the MOR to two decimal places (to the hundredths place). Conventional rounding is an acceptable method to convert a three decimal place value to a two decimal place value. (Examples of numbers to two decimal places include 0.12 NTU, 1.15 NTU, 0.14 NTU, 0.06 NTU, etc.).
2. Using the tables below, check to see if the two decimal place turbidity value is in compliance with the appropriate turbidity standard. If the value is in the compliance range, the turbidity standard has been met. If the value is in the non-compliance range, the turbidity standard has not been met.

Note: Conventional and alternative filtration water treatment plants exceeding 1 NTU and slow sand plants exceeding 5 NTU must report the exceedance as soon as practical but no later than 24 hours after the exceedance is known in accordance with OAC Rule 3745-81-75(E).

COMBINED FILTER EFFLUENT STANDARDS (Compliance/Non-Compliance Ranges)

All SWTP's except slow sand filtration:

Standard to never exceed 1 NTU (single sample):
Compliance (0 through 1.44 NTU)
Non-compliance (1.45 NTU and greater)

Standard of 0.3 NTU or less in 95 percent of samples:
Compliance (0 through 0.32 NTU)
Non-compliance (0.33 NTU and greater).

Slow Sand Filtration:

Standard to never exceed 5 NTU (Single sample):
Compliance (0 through 5.44 NTU)
Non-Compliance (5.45 NTU and greater)

Standard of 1 NTU or less in 95 percent of samples:
Compliance (0 through 1.44 NTU)
Non-Compliance (1.45 NTU and greater)

Appendix C: Procedure for Determining Compliance with Turbidity Standards

INDIVIDUAL FILTER EFFLUENT STANDARDS (Follow up action needed/ Follow up action not needed)

All SWTP's except slow sand:

Exceedance of 1.0 NTU Turbidity Trigger

Follow up action not needed (0 through 1.04 NTU)

Follow up action needed (1.05 NTU and greater)

Exceedance of 2.0 NTU Turbidity Trigger

Follow up action not needed (0 through 2.04 NTU)

Follow up action needed (2.05 NTU and greater)

Exceedance of 0.5 NTU Turbidity Trigger (SW systems with a population of at least 10,000)

Follow up action not needed (0 through 0.52 NTU)

Follow up action needed (0.53 NTU and greater)

