ESSENTIALS OF SURFACE WATER TREATMENT TRAINING
Exercise #6: Filling out the monthly surface water report

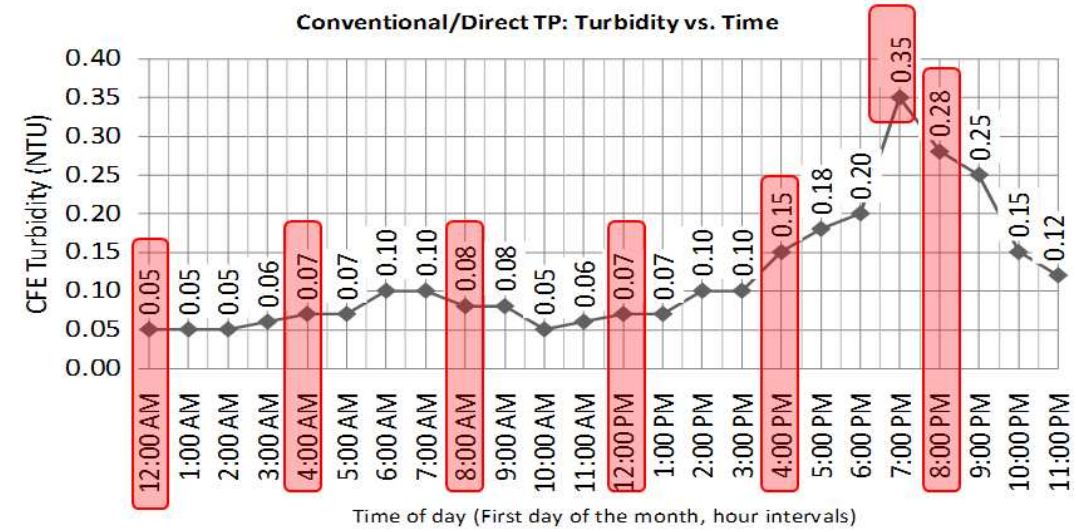
Example #1: Conventional or direct filter plant

Turbidity

1. Use the data in the graph to record the 4-hour daily turbidities on the first day of the month of the Conventional/Direct Filtration monthly reporting form.

2. What number should be entered in the "Highest Reading of the Day (NTU)" column? **0.35 NTU**

DAY	12 AM [NTU]	4 AM [NTU]	8 AM [NTU]	NOON [NTU]	4 PM [NTU]	8 PM [NTU]	Highest Reading of the Day[1] [NTU]
1	0.05	0.07	0.08	0.07	0.15	0.28	0.35



3. Let's say your plant runs 24 hours a day and you have turbidity readings filled in for every 4-hour interval for all 31 days of the month. How many readings could you have that were > 0.3 NTU? (Hint: 95% of readings must be ≤ 0.3 NTU) **9**

(6 readings/day x 31 days = 186 readings total. 5% x 186 = 9.3)

4. What should you do if you answer "no" to the turbidity question "All readings ≤ 1 NTU?" on the bottom of the form? **a**
   a) Call the state
   b) Issue a boil water notice
   c) Issue a public notice within 30 days
   d) Both a & c

5. What should you do if you answer "no" to the turbidity question "All readings < IFE triggers?" on the bottom of the form? **a**
   a) Call the state
   b) Issue a boil water notice
   c) Issue a public notice within 30 days
   d) Both a & c

(Over)

CT Calculations (assume 2.5-log conventional plant)

1. Use the following parameters to calculate the CTs achieved at the plant and fill it in on the form on first day of the month:
   - Free chlorine residual: 0.6 ppm
   - Contact time: 100 minutes

2. Use the following parameters to calculate the CTs required using the EPA tables from Exercise 5 and fill it in on the form:
   - Temp: 12°C
   - pH: 7.2

Date / Time	Minimum Cl_2 Residual at 1st User (**C**) [ppm or mg/L]	Contact Time (**T**) [min]	Actual CT **C X T**	Temp [° C]	pH	Required CT	CT Met? Yes / No	Peak Hourly Demand Flow [GPM]
1 /	0.6	100	60	12	7.2	21	Yes	2000

3. Are CTs met at the plant for this day? **Yes - CT achieved (60) is > CT required (21)**

4. Let's say the Peak Hourly Demand Flow for the day was 2000 gpm. If the Peak Hourly Demand Flow during the tracer study was 1750 gpm, is this a problem? Why or why not? **Yes this is a problem – flow cannot exceed 10% of tracer study flow. 10% x 1750 gpm = 175 gpm. 1750 + 175 = 1925 gpm. Therefore flow cannot be >1925 gpm or else a new tracer study is needed.**

5. What should you do if you answer "no" to either of the CT questions on the turbidity side of form?
   - "CTs met at all times?" **a**
     a) Call the state
     b) Issue a boil water notice
     c) Issue a public notice within 30 days
     d) Both a & c

   - "Residual at EP ≥ 0.2 ppm at all times?" **a**
     a) Call the state
     b) Issue a boil water notice
     c) Issue a public notice within 30 days
     d) Both a & c

OHA - Drinking Water Program – Turbidity Monitoring Report Form County:
Conventional or Direct Filtration

System Name: **ID #:** **WTP-:** **Month/Year:**

DAY	12 AM [NTU]	4 AM [NTU]	8 AM [NTU]	NOON [NTU]	4 PM [NTU]	8 PM [NTU]	Highest Reading of the Day[1] [NTU]
1	**0.05**	**0.07**	**0.08**	**0.07**	**0.15**	**0.28**	**0.35**
2							
3							
4							
5							
6							
7							
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9							
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Conventional or Direct Filtration	**Monthly Summary (Answer Yes or No)**	
95% of the 4-hour turbidity readings ≤ 0.3 NTU? **Yes** / **No** All the 4-hour turbidity readings ≤ 1 NTU? **Yes** / **No** All turbidity readings < IFE[2] triggers? **Yes** / **No** [2]	CT's met everyday? (see back) **Yes** / **No**	All Cl_2 residuals at entry point ≥ 0.2 mg/l? **Yes** / **No**
Notes:	**PRINTED NAME:**	
	SIGNATURE:	**DATE:**
	PHONE #: ( )	**CERT #:**

[1] Including continuous turbidity data, if applicable, for optimization recording purposes. Compliance values in columns "12 AM" through "8 PM" may not correspond to continuous readings' maximum.

[2] IFE = Individ. Filter Effl. (OAR 333-061-0040(1)(e)(B&C))

OHA - Drinking Water Program – Surface Water Quality Data Form - *Giardia* Inactivation

System Name: **ID #:** **WTP-:** **Month/Year:** **Log Requirement (Circle One): 0.5 / 1.0**

Date / Time	Minimum Cl_2 Residual at 1st User (**C**) [3]	Contact Time (**T**)	Actual CT	Temp	pH	Required CT	CT Met? [3]	Peak Hourly Demand Flow
	[ppm or mg/L]	[minutes]	**C X T**	[°C]		Use tables	Yes / No	[GPM]
1 /	**0.6**	**100**	**60**	**12**	**7.2**	**21**	**Yes**	**2000**
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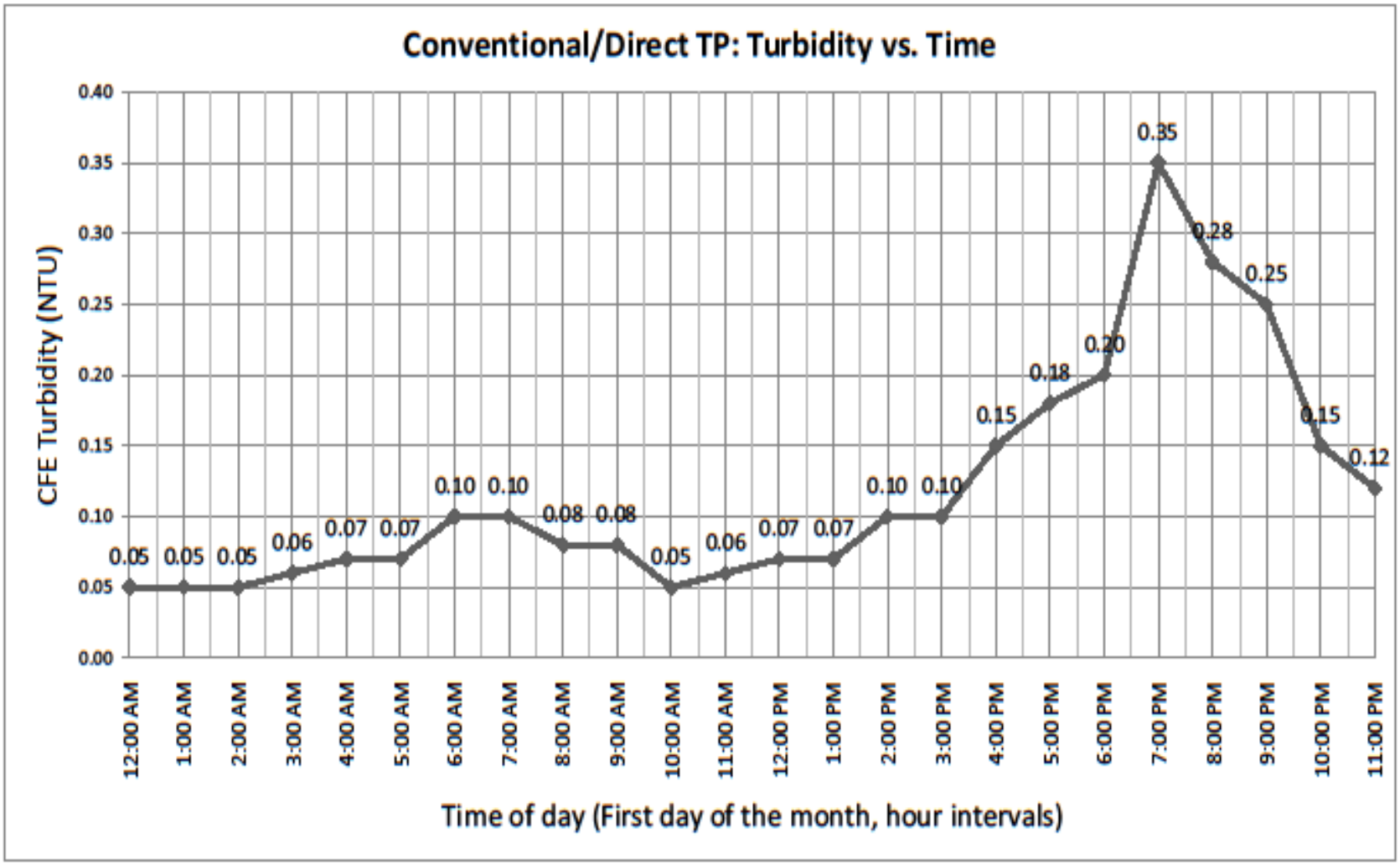
27 /								
28 /								
29 /								
30 /								
31 /								

[3] If Cl_2 at entry point < 0.2 mg/l, OR CT not met, notify DWP by end of next business day. Revised February 2012.

Download form at: public.health.oregon.gov/HealthyEnvironments/DrinkingWater/Monitoring/Documents/turb-conv-direct.pdf


Conventional/Direct TP: Turbidity vs. Time
CFE Turbidity (NTU)
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.05 0.05 0.05 0.06 0.07 0.07 0.10 0.10 0.08 0.08 0.05 0.06 0.07 0.07 0.10 0.10 0.15 0.18 0.20 0.35 0.28 0.25 0.15 0.12
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
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4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time of day (First day of the month, hour intervals)

Example #2: Slow sand, Membrane, or DE filter plant (2-log)

Turbidity

1. Use the data in the graph to record the daily CFE turbidity on the first day of the month of the Slow Sand/Membrane/DE Filtration monthly reporting form. Which 4-hour column should it be recorded in? Why? **Any of the columns is fine to use. Most people use the column that is closest to the time they observed the turbidity**

2. What number should be entered in the "Highest Reading of the Day (NTU)" column? **1.2 NTU**

DAY	12 AM [NTU]	4 AM [NTU]	8 AM [NTU]	NOON [NTU]	4 PM [NTU]	8 PM [NTU]	Highest Reading of the Day [NTU]
1			0.2				1.2
2							

3. Let's say your plant runs every day and you have turbidity readings filled in once a day for all 31 days of the month. How many readings could you have that were > 1 NTU? (Hint: 95% of readings must be ≤ 1 NTU). **Only 1 (5% of 31 readings = 1.6)**

4. What should you do if you answer "no" to the turbidity question "All readings ≤ 5 NTU?" on the bottom of the form? **a**
   a) Call the state
   b) Issue a boil water notice
   c) Issue a public notice within 30 days
   d) Both a & c

CT Calculations

1. Use the following parameters to calculate the CTs achieved at the plant and fill it in on the form on first day of the month:
   - Free chlorine residual: 0.3 ppm
   - Contact time: 60 minutes

2. Use the following parameters to calculate the CTs required using the EPA tables from Exercise 5 and fill it in on the form:
   - Temp: 9°C
   - pH: 7.8

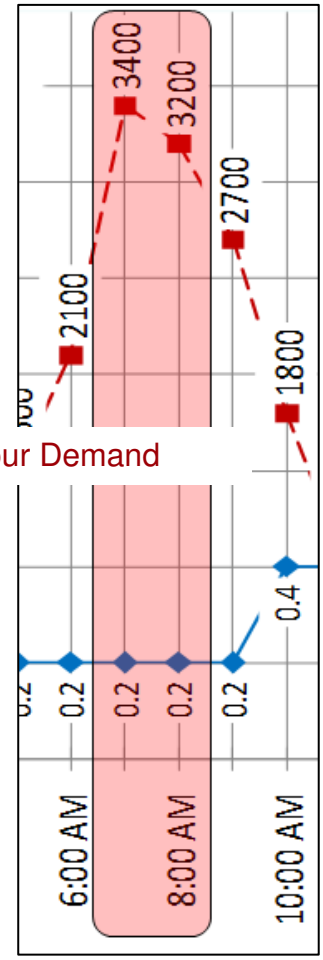
3. Are CTs met at the plant for this day? **No - CT achieved (18) is < CT required (66)**

Date / Time	Minimum Cl_2 Residual at 1st User (**C**) [ppm or mg/L]	Contact Time (**T**) [minutes]	Actual CT **C x T**	Temp [° C]	pH	Required CT Use tables	CT Met? Yes / No	Peak Hourly Demand Flow [GPM]
1 /	0.3	60	18	9	7.8	66	No	

4. What number should be entered in the "Peak Hourly Demand Flow" column?_ **3300 gpm.**
Average of flows between 7 am and 8 am.

Exercise #6, Example #2 Slow Sand - Peak Hour Demand Determination

Time	Flow Reading (gpm)	Running hourly average of demand flow readings (gpm)
12:00 AM	500	
1:00 AM	850	675
2:00 AM	800	825
3:00 AM	950	875
4:00 AM	950	950
5:00 AM	1500	1225
6:00 AM	2100	1800
7:00 AM	3400	2750
8:00 AM	3200	3300 <= Peak Hour Demand
9:00 AM	2700	2950
10:00 AM	1800	2250
11:00 AM	1100	1450
12:00 PM	1600	1350
1:00 PM	1200	1400
2:00 PM	1000	1100
3:00 PM	900	950
4:00 PM	800	850
5:00 PM	1200	1000
6:00 PM	2000	1600
7:00 PM	2300	2150
8:00 PM	2200	2250
9:00 PM	1600	1900
10:00 PM	900	1250
11:00 PM	700	800



Date / Time	Minimum Cl_2 Residual at 1st User (**C**) [ppm or mg/L]	Contact Time (**T**) [minutes]	Actual CT **C X T**	Temp [° C]	pH	Required CT Use tables	CT Met? Yes / No	Peak Hourly Demand Flow [GPM]
1 /	0.3	60	18	9	7.8	66	No	**3300**

5. What should you do if you answer "no" to either of the CT questions on the turbidity side of form?

- "CTs met at all times?" **a**
  a) Call the state
  b) Issue a boil water notice
  c) Issue a public notice within 30 days
  d) Both a & c
- "Residual at EP ≥ 0.2 ppm at all times?" **a**
  a) Call the state
  b) Issue a boil water notice
  c) Issue a public notice within 30 days
  d) Both a & c

OHA - Drinking Water Program – Turbidity Monitoring Report Form County:
Slow Sand, Membrane, Diatomaceous Earth Filtration, or Unfiltered Systems

System Name: **ID #:** **WTP-:** **Month/Year:**

DAY	12 AM [NTU]	4 AM [NTU]	8 AM [NTU]	NOON [NTU]	4 PM [NTU]	8 PM [NTU]	Highest Reading of the Day [1] [NTU]
1			**0.2**				**1.2**
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31							

Slow Sand/Membrane/DE Filtration/Unfiltered	**Monthly Summary (Answer Yes or No)**	
95% of daily turbidity readings ≤ 1 NTU? [2] **Yes** / **No** All daily turbidity readings ≤ 5 NTU? **Yes** / **No**	CT's met everyday? (see back) **Yes** / **No**	All Cl_2 residual at entry point ≥ 0.2 mg/l? **Yes** / **No**
Notes:	**PRINTED NAME:**	
	SIGNATURE:	**DATE:**
	PHONE #: ( )	**CERT #:**

[2] Including continuous turbidity data, if applicable, for optimization recording purposes. Compliance values in columns "12 AM" through "8 PM" may not correspond to continuous readings' maximum. [2] Filtered systems only.

OHA - Drinking Water Program – Surface Water Quality Data Form

System Name: **ID #:** **WTP-:** **Month/Year:**

Date / Time	Minimum Cl_2 Residual at 1st User (**C**) [3]	Contact Time (**T**)	Actual CT	Temp	pH	Required CT	CT Met? [3]	Peak Hourly Demand Flow
	[ppm or mg/L]	[minutes]	**C X T**	[°C]		Use tables	Yes / No	[GPM]
1 /	**0.3**	**60**	**18**	**9**	**7.8**	**66**	**No**	**3300**
2 /								
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9 /								
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11 /								
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24 /								
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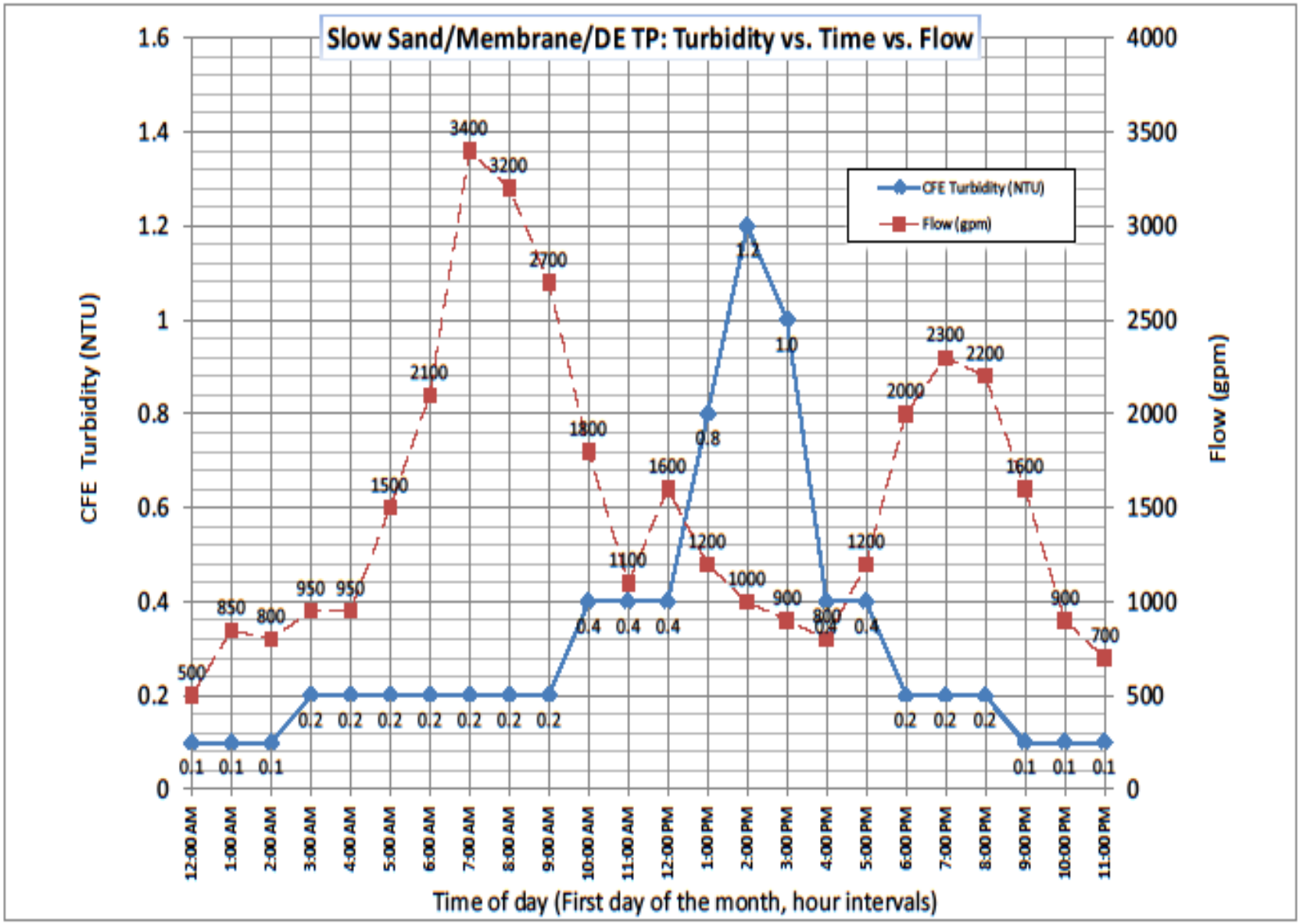
26 /								
27 /								
28 /								
29 /								
30 /								
31 /								

[3] If Cl_2 at entry point < 0.2 mg/l OR CT not met, notify DWP by end of next business day. Revised February 2012

Download form at: public.health.oregon.gov/HealthyEnvironments/DrinkingWater/Monitoring/Documents/turb-alt-unfiltered.pdf


Slow Sand/Membrane/DE TP: Turbidity vs. Time vs. Flow
CFE Turbidity (NTU)
Flow (gpm)
Time of day (First day of the month, hour intervals)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
4000
3500
3000
2500
2000
1500
1000
500
0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
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11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
0.1 0.1 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.4 0.4 0.4 0.8 1.2 1.0 0.4 0.4 0.2 0.2 0.2 0.1 0.1 0.1
500 850 800 950 950 1500 2100 3400 3200 2700 1800 1100 1600 1200 1000 900 800 1200 2000 2300 2200 1600 900 700