



June 2015  
DOH 331-538

## Fact Sheet

# Turbidity monitoring and meter setup *For rapid-rate filtration plants*

In rapid-rate water filtration plants treating surface water, turbidity measurements are the single most important parameter used to verify that the filtration process is working correctly and removing potential pathogenic organisms from the source water.

Many factors can affect the accuracy of the turbidity data generated, recorded, and reported to utilities and health departments, including instrument settings, physical locations, electronic data manipulation, operational practices, and human actions.

In 2013, we studied 25 rapid-rate filter plants in Washington State. We found deficiencies in all 25 plants that could or did affect the accuracy of the turbidity data reported to us. A whopping 92 percent of the surveyed plants lacked written standard operating procedures (SOP) for instrument settings and reporting. The information below and the recommendations in the chart on page 2 will help you confirm the accuracy of your turbidity settings and procedures.

### **Combined filter effluent (CFE) monitoring**

#### **Reporting 4-hour CFE measurements**

You must report turbidity readings to us each month (WAC 246-290-666). You should take the CFE turbidity readings within 15 minutes after the initial plant start-up (filtered water sent to the clear well or distribution) and then at exactly 4-hour intervals for as long as the plant continues to run. Record these values on your monthly report.

#### **Reporting the daily CFE maximum**

The maximum CFE turbidity measurement is the highest turbidity of water your plant produces and sends to consumers during the calendar day. It is not the maximum of the 4-hour readings.

#### **Special situations that affect CFE reporting**

If your plant does not operate continuously throughout the day, record a new initial turbidity reading within 15 minutes of restarting the filter, and then every four hours.

We encourage systems with only two filters that have a poor CFE sampling situation to use the highest individual filter effluent (IFE) reading as the CFE value on their monthly reports. If a two-filter system operates only one filter during low-demand periods, the IFE of the operating filter is the CFE value for low-demand operating periods.

Larger systems with multiple filters that discharge directly into a common clear well should use a pumped sample from an appropriate location in the clear well. The location should receive completely mixed water from all filters and be as close as possible to filter discharges into the clearwell. Avoid pumps that cause pulsation, such as diaphragm, piston, and peristaltic pumps.



HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

# Turbidity Meter Setting or Activity

| Written SOPs for turbidimeter settings             | Required  |
|--|---|
| Sample flow rate                                   | Measure at least monthly. Meet the manufacturer's specifications                        |
| Error hold mode                                    | Transfer to 0.0 NTU   |
| Signal averaging                                   | 30 seconds  |
| Weekly verification check <sup>1</sup>             | Required. Record numbers. Can use ice pik method.                                       |
| Bulb replacement                                   | At least annually or as the manufacturer recommends                                     |
| Instrument specific maintenance log                | Required  |
| Primary calibration                                | At least quarterly  |
| Signal span <sup>2</sup>                           | 0 to 5 NTU for finished water   |
| Data recorder <sup>3</sup>                         | Required. Must be calibrated to sensor output   |
| Bubble reject                                      | On  |
| Sensor data log interval (if no SCADA or recorder) | 1 or 5 minutes (1 minute preferred unless data storage or processing limitations exist) |

<sup>1</sup> You must compare the continuous turbidimeters to a calibrated bench-top turbidimeter to verify that the continuous units maintain accuracy between quarterly calibrations, and maintain operator proficiency with the bench top unit.

- **If a continuous unit fails**, ongoing turbidity monitoring is required using the bench-top unit. Results between the continuous unit and the bench top may not match. An acceptable difference between the values is 10% or +/- 0.05 NTU.
- **If the difference between units is inconsistent or too large**, call our regional office or the instrument manufacturer. We recommend recording the weekly verification values in the turbidimeter specific maintenance logbook.

<sup>2</sup> You must set the signal span or maximum value above the regulatory limit for that monitoring location. The CFE turbidimeter must be able to measure and record turbidities exceeding 1.0 NTU and IFE turbidimeters must be able to measure and record turbidities exceeding 2.0 NTU.

<sup>3</sup> The instrument output scale must match the SCADA or recorder scale.

## For more information

Call your regional office.

**Eastern Region:** Spokane Valley 509-329-2100

**Northwest Region:** Kent 253-395-6750

**Southwest Region:** Tumwater 360-236-3030



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