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Questions & Answers

Testing critical alarms

What are critical alarms?

Critical alarms help to ensure your disinfection and filtration are working, there is neither too much nor too little water in the clearwell, and you are not adding unsafe amounts of key water-treatment chemicals. The focus is on critical treatment processes, such as coagulation, filtration, and disinfection, where treatment failure poses an immediate risk to public health or safety.

What are examples of critical alarms?

Each treatment plant has a unique set of critical alarms. The most common are turbidity, chlorine residual, pH, and clearwell level.

What are typical set points for critical alarms?

The alarm setting must allow a margin of safety so you can correct the problem or shut down the process before a regulatory or health limit is reached. If your plant runs in unattended mode, alarms must trigger plant shutdown, not just dial out to the on-call operator.

What are some ways to test critical alarms?

- **Alarm set points:** Check the alarm settings at each on-line instrument. If you have a SCADA system, check the settings in the control program by checking each critical alarm against a master list from your written Operations Program.
- **Chlorine residual:** Shut off the flow in the sample line and inject an unchlorinated or overchlorinated test solution. Restore normal flow to the instrument when finished.
- **Turbidity:** Pull the head of the turbidimeters to simulate a high reading. Lower the alarm set point to below the current reading until the alarm triggers. Restore the set point when complete.
- **pH:** Shut off the flow in the sample line and inject a high pH or low pH test solution. Restore normal flow to the instrument when finished.

How often should alarms be tested?

If your plant runs in unattended mode, critical alarms must be tested at least *monthly*. If your plant is staffed 24/7, alarms should be tested at least *quarterly* or at the same time as routine manufacturer-recommended instrument calibration. Alarms should always be tested following a power outage or after work is done on the system.

Washington State Department of Health
Environmental Public Health Division
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What should we do if an alarm fails?

Call our regional office to find out whether a health advisory or other follow-up is needed. Conduct an after-incident review, correct any deficiencies, and document lessons learned.

What else should we know?

Read the references below. Take time now to review your plant's standard operating procedures to make sure your customers are protected even when things go wrong.

1. **Reliability for Filtered System, WAC 246-290-678**
   http://apps.leg.wa.gov/wac/default.aspx?cite=246-290-678
2. **Calibrating Turbidity Meters (331-404)**
   http://www.doh.wa.gov/portals/1/Documents/pubs/331-404.pdf
3. **AWWA Standard G100-11: Water Treatment Plant Operation and Management**
   http://www.awwa.org/store/productdetail.aspx?productid=6923
4. **Recommended Standards for Water Works.** Policies for reviewing and approving plans and specifications for public water supplies.
   http://10statesstandards.com/waterrev2012.pdf

Typical Alarm Set Points

		Purpose	Typical Set Points
Turbidity (combined filter effluent)	High	To alert the operator of a significant process change so corrective action can be taken.	0.10 NTU or slightly less.
	High-high (shutdown)	To avoid a water quality violation.	Slightly less than 0.30 NTU.
Chlorine Residual	Low-low (shutdown)	To keep inadequately disinfected water (IR<1.0 or <0.2 mg/L) from entering the distribution system.	Treatment plant specific. Likely be 0.2 to 0.6 mg/L.
	High-high (shutdown)	To avoid exceeding the maximum residual disinfectant level (MRDL).	Can be set as high as 4.0 mg/L, but should be lower.
pH	Low-low (shutdown)	To detect an overfeed. Used only if an acid is fed.	A pH of 5.5 to 6.0 could be used in most situations.
	High-high (shutdown)	To prevent high pH water from entering the distribution system.	A pH 9.0 to 9.5 could be used in most situations.
Clearwell Level	Low	To avoid inadequately disinfected water (IR<1.0) from entering the distribution system.	Unique for each system.
	High-high (shutdown)	To prevent an overflow.	Unique for each system.

For more information:

Call your ODW regional office.

Eastern Region: Spokane 509-329-2100

Northwest Region: Kent 253-395-6750

Southwest Region: Tumwater 360-236-3030

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