

Topic: Determining 4-hour interruption of GWR 4-log disinfection treatment for treatment technique violation

Date: Jan. 29, 2020. BP, CL

Note: This interpretation addresses whether a Tier 2 treatment technique violation has occurred. For concerns about immediate public health risks, see another procedure: “Determining Tier 1 Boil Advisory for SW, GWUDI and GW systems with 4-log viral disinfection requirements that have a disinfection interruption.”

Rule: OAR 333-061-0036(11)(e) for GWR 4-log disinfection monitoring says: “It is a violation of this rule if a water supplier fails to correct any disruption in treatment *within four hours of determining the disruption is occurring* at a groundwater system subject to the requirements of subsection (11)(b) of this rule where at least 4-log treatment of viruses (using inactivation, removal, or an Authority approved combination of 4-log virus inactivation and removal) is required before or at the first customer.”

Issue: What does “within 4 hours of determining the disruption” mean for compliance? When does the clock start? Systems <3300 population are only required to have an operator to read/record the chlorine residual once a day. Other systems may have continuous monitoring, whether or not that is required by population. Could the 4 hours start at different times in these scenarios?

Decision:

- If continuous monitoring data is required and shows the disinfection treatment did not meet the established minimum for 4 hours of operations, they did not meet the treatment requirement.
 - The 4-hour clock starts when their continuous monitor showed the problem, not when staff arrived to look at it. Systems > 3300 are also required to have an alarm or auto-shutoff for low chlorine residual, so the alarm would determine the start time as well. (System is accountable for that time even if their required alarm/shutdown does not work.)
 - The 4-hour time period encompasses the length of time the chlorine residual is below the minimum measured at the entry

point, regardless of “run time.” In other words, a system cannot only count the minutes that the system was producing water for the distribution within a longer block of time, if the system runs intermittently based on demand. The whole period counts. However, if the system had completely shut down the plant (so no water could be produced), the down time would not be included in the 4 hours.

- If they have continuous monitoring data but it is not required (<3300 pop). They may still only check the level once a day, so the 4-hour clock does not start until they check the readings.
 - Example #1 with continuous monitoring and no alarm: the chlorine level has been below the established minimum during normal operating conditions all night, and the water system operator finds the problem the next morning and immediately shuts down the plant and fixes it. In this case, the hours before it was discovered do not count towards the 4-hour total.
 - Example #2 with continuous monitoring and an alarm but neither is required: the 4-hour clock starts when an operator is alerted to the lower chlorine level, either via the alarm or when they routinely check the chlorine level and discover the problem. System shall not be penalized for having an alarm when it is above and beyond their requirements.
- If continuous data are not available (not required at systems < 3300) and the treatment level is only checked once a day, the 4-hour clock for corrections begins when they discover the problem. For example, the operator checks it at noon everyday – they would have till 4 pm to correct the level before a violation occurs.

Rationale and Further Explanation:

- If the system is required to have an alarm, the alarm will notify them when the chlorine level drops below the minimum during normal operations, so that’s when the 4-hour clock for correction begins. (If not meeting the minimum causes a shutdown rather than an alarm, the shut-down time is not counted because no water is being produced that is non-compliant – no public health risk.)
- A system without an alarm will not be able to start correcting the problem until the next time the operator reads the chlorine level and finds the problem, so the 4-hour timeframe starts at that reading.

Related rules:

- Contrast the GWR 4-log disruption rule wording above with that for maintaining minimum residual for surface water/ GWUDI treatment (found in [-0032\(3\)\(c\)](#) if no filtration and [-0032\(5\)\(b\)](#) if filtration): “The residual disinfectant concentration in the water entering the distribution system, measured as specified in OAR 333-061-[0036\(5\)\(a\)\(E\)](#), cannot be less than 0.2 mg/l for more than 4 hours.” No language about “determining” a disruption.
- Disinfection grab sampling at GWR 4-log systems is required (per OAR 333-061-0036(11)(b)(A) and (B)):
 - At systems with continuous monitoring. If there is a failure in the monitoring equipment, grab sampling must be conducted every 4 hours until continuous monitoring is restored. This will demonstrate whether adequate treatment continued during that time.
 - At systems without continuous monitoring. If any daily grab sample measurement falls below the minimum determined by the Authority, follow-up samples must be collected every 4 hours until the residual disinfectant concentration is restored to the Authority-determined level.

Policy Implementation History:

- This rule interpretation was applied to the City of Brookings in early 2019 when they experienced problems with their chlorine gas regulator. Their monthly report to DMCE included both the periods of time the chlorine level at the approved monitoring location was below the minimum, and the periods within those windows that the plant was actually producing water (it runs intermittently based on demand). Pumping time is not relevant to compliance- only the maximum period during operations when the minimum residual was not met. Additional data showed that there was no period in January where they did not meet the minimum for more than four hours. However, in February and March that was the case, so they received treatment technique violations for those two months. Thinking ahead, they asked how this rule would apply during impending electrical service upgrades in their area, knowing that the plant would be shut down for 8-10 hours on a few days. Because in that scenario the plant would be taken offline entirely (no possibility of water flowing to distribution), they would

not need to meet the minimum chlorine residual during the shutdown (noting the shutdown period on the monthly report). They would only need to meet the minimum treatment during those days (or parts of days) that the plant was online.

- A community PWS on GWR 4-log virus inactivation (by choice to avoid 12-months of assessment monitoring on all 13 wells; no *E. coli* ever detected) had their SCADA system crash shortly after midnight. One source pump continued to run (original well on manual mode) sending water to distribution without the chlorine feed pump running. This condition continued between 5 to 6 hours before an operator arrived on-site in the morning and restarted the SCADA system. Chlorine residual was manually measured in distribution at and around the first user and found to be above the required minimum. Since the official entry point is at the WTP, where continuously monitored chlorine residual had dropped below the required minimum for over 4 hours, the PWS was issued a violation.
- DWS may pursue a future wording change in the GWR 4-log disinfection treatment rule to clarify the 4-hour timeframe.