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Press Release

Possible treatment technique violation at Water Plant reported, disregarded

KDHE says its interpretation of pH data does not support violation; citizens never in danger

ARKANSAS CITY, Kan. (June 18, 2015) — On May 27, 2015, the City of Arkansas City notified the Kansas Department of Health and Environment (KDHE) of a possible treatment technique violation at its Water Treatment Plant that occurred on May 26, 2015, but the City was informed Thursday, June 18, by KDHE that no violation technically had occurred.

The public was not in any danger during the six hours in question. The same water quality was delivered to customers as always. But despite the lack of an official violation, the City has implemented additional safeguards to prevent a possible violation from occurring again.

The potential violation was due mainly to a change in the classification of the City's source water and the imprecision of the lime treatment process, along with differing interpretations of pH data.

Prior to Feb. 1, 2015, the City operated under Environmental Protection Agency (EPA) regulations concerning ground water under the influence of surface water (the Surface Water Treatment Rule).

In preparation for the construction of a new water treatment plant and to achieve a considerable cost savings on that project in the treatment process, the City petitioned KDHE to reclassify the source water from its wells to ground water, transitioning the City's water treatment to EPA's Ground Water Rule.

After conducting microscopic particulate analysis (MPA) testing on each water well, KDHE approved the source water reclassification. Since Feb. 1, the City has operated under the Ground Water Rule.

That means the method used by the City to ensure the disinfection of water in the primary contact basin, known as 4-log inactivation, experienced regulatory changes as a result of this reclassification — most notably, a reduced upper limit to the pH that EPA's Ground Water Rule allows the water to be at for more than four hours.

To prove 4-log inactivation of viruses under the Ground Water Rule using the primary basin as a free chlorine contact zone, the water's pH cannot exceed 10.49 for more than four hours, among other factors. In this case, the pH in the primary basin was higher than 10.49 during three consecutive samples taken at 9 a.m., 11 a.m. and 1 p.m. on May 26.

For immediate release

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The City of Arkansas City was concerned and reported to KDHE that a possible treatment technique violation might have taken place, due to the pH in the primary basin effluent's being higher than 10.49 for at least six hours on May 26, which requires a Tier 2 public notice.

4-log inactivation parameters

The pH value is used by EPA to calculate virus inactivation, but that calculation cannot be performed if the pH is greater than 10.49 — even though the Water Treatment Plant often operated at pH values of higher than 10 when it still was operating under the Surface Water Treatment Rule, providing water of the same quality to Arkansas City customers.

Four factors are required to prove 4-log inactivation of viruses under the Ground Water Rule:

1. an upper flow limit of 4.2 million gallons per day;
2. a maximum pH of 10.49;
3. a minimum temperature of 10.6 degrees Celsius;
4. a minimum chlorine residual of 1.54 milligrams per liter.

The Water Treatment Plant has performed well within these new parameters, with only two exceptions — the incident on May 26, and a previous high pH excursion that lasted for less than four hours and thus did not require public notice (although it also was reported to KDHE).

It is worth noting that most states will allow using 10 pH points on the 4-log inactivation calculator when the pH is higher than 10, but the State of Kansas is not one of them.

Lime treatment process difficulties

Water Treatment Plant staff members put all of their effort into maintaining the pH within the acceptable range for the EPA 4-log inactivation calculator to work.

The lime is blown into a silo, conveyed by a bucket lift and augured to bins above the lime machine.

This lime is not all of the same consistency — powdered lime reacts "hotter" than the larger lime particles, which are more like pebbles. Lime dosage is based on weight, but if a slug of the "hotter," more reactive lime goes through the feeder, the pH might rise to a higher level than the operator is expecting.

Based on the required Water Treatment Plant flow, the detention time in the primary contact basin can be up to six hours. As a result, even if the operator notices the rising pH and acts to mitigate it, the results of that lime dosage adjustment might not be seen for six more hours, resulting in a violation.

The reverse osmosis and greensands treatment processes that are planned for the new water treatment plant will eliminate these complications and uncertainties from City water treatment.

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Corrective actions taken

The potential for a treatment technique violation was detected after pH reads in excess of 10.49 were taken at 9 a.m., 11 a.m. and 1 p.m. on May 26, indicating that the operations technically were out of compliance during those hours.

KDHE was notified of the possible violation via email correspondence and it was reported on the Monthly Disinfection (4-log Treatment) Report for the Ground Water Rule, submitted June 3, 2015.

(Note: That Monthly Disinfection Report is attached to the same email as this press release.)

Based on returned email correspondence from KDHE, the City assumed a formal notification would be sent by KDHE that required public notification of the treatment technique violation.

In the interests of transparency, the City staff began the process of preparing the public notification and discussing the Tier 2 public notification requirements with the City Commissioners.

However, on June 18, KDHE informed the City that because there were no definitive sample results that prove the pH was out of compliance before 9 a.m. or after 1 p.m. on May 26, it will not consider this occurrence as a treatment technique violation and instead considers the incident as an allowable four-hour pH excursion. Additionally, KDHE indicated a Tier 2 public notification would not be required.

Detection came thanks to the safeguards that already were in place. Operators perform pH analysis every two hours and check the lime dosage frequently. A maximum level of lime dosage has been set that is not to be exceeded.

Since the incident on May 26, additional safeguards have been put into place. The lime dosage procedure was reviewed and adjusted to keep the pH between 9.3 and 9.9 units. This revised procedure includes adjustments for flows of both less than and more than 2.5 million gallons per day. Adjustments are made based upon the results of specific heat rise tests on the lime when it is delivered.

Types of public notification

Tier 2 public notifications fall into the middle grade of violations that are reportable under EPA guidelines.

Tier 1 public notifications are for the most serious violations, requiring that immediate public notice be given within 24 hours. This tier is for violations and situations that have significant potential to have serious and immediate adverse effects on human health as a result of short-term exposure.

Tier 2 public notification is required as soon as possible, but must be given within 30 days. That is the process the City had begun to undertake this week when it was determined by KDHE that no violation had occurred.

Tier 2 is for violations and situations that have the potential to have adverse effects on human health, but do not pose an immediate risk.

The least serious violations require Tier 3 notice. This tier is for all other violations, usually monitoring or reporting violations, and other situations that require annual public notice.

Tier 3 notification is required within 12 months and usually is included in the City's annual Consumer Confidence Report, since it has to be delivered by July 1 of the following year.

If any Tier of public notification is required due to violation of drinking water regulations, KDHE will send formal notification of the requirements to the City.