Fluoride in Olathe's Drinking Water: Current Practices and Emerging Considerations

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In Olathe, the journey to water fluoridation was marked by community votes. Initially, in 1956, residents voted against adding fluoride to the water supply, with 330 in favor and 485 against. This decision was overturned in 1959 when a new vote resulted in 423 in favor and 329 opposed, leading to the adoption of water fluoridation, a practice that has continued to this day.

There are no state or federal mandates requiring fluoride to be added to drinking water. However, the U.S. Public Health Service, the Centers for Disease Control and Prevention, and the American Dental Association recommend fluoridation at a concentration of 0.7 milligrams per liter (mg/L) (U.S. Department of Health and Human Services Federal Panel on Community Water Fluoridation, 2015). Long-standing public health policy supports fluoridation of drinking water as a protective measure against dental caries, particularly in children. The addition of fluoride to public water supplies is often cited as a public health success, providing widespread dental health benefits to the community regardless of socioeconomic status.

At higher levels, fluoride can have adverse effects, leading the Kansas Department of Health and Environment and the United States Environmental Protection Agency (EPA) to set a secondary contaminant limit at 2.0 mg/L and a maximum contaminant level at 4.0 mg/L fluoride in finished water. A drinking water system with fluoride levels between 2.0 mg/L and 4.0 mg/L must test and submit compliance reports more frequently than Olathe's standard reporting frequency of once per annual quarter. A system reporting greater than 4.0 mg/L fluoride is required, among other actions, to notify the public and implement corrective measures to reduce fluoride concentration in their finished water.

The alluvial aquifer of the Kansas River, which serves as the water source for Olathe, naturally contains about 0.25 mg/L geologically sourced fluoride. Fluoride concentrations in untreated groundwater in the western U.S. are generally higher than in the east, with several factors affecting fluoride concentrations, including mean annual precipitation, pH, and well depth (McMahon et al., 2020). Olathe's Environmental Services staff sample and test the combined well water feeding the Water Plant twice weekly for background fluoride levels.

At Olathe's Water Plant, fluoride is added to the water supply to maintain a target concentration of 0.7 mg/L at the point where finished water leaves the Water Plant and enters the distribution system.

Table 1 illustrates a generally consistent concentration of 0.7 mg/L in samples taken at the entry point to the distribution system and analyzed by ion chromatography.

Table 1. Fluoride data at entry point to distribution system at Olathe's Water Plant, 2022 through 2024.

Year	Number of Samples	Fluoride Concentration (mg/L)				
		Average	Standard Deviation	Minimum	Median	Maximum
2022	367	0.7	0.05	0.3	0.7	0.8
2023	367	0.7	0.06	0.5	0.7	0.8
2024	364	0.7	0.04	0.6	0.7	0.8

Tight control of fluoride addition is achieved using peristaltic pumps that automatically adjust to the flow rate of water being processed. This addition is monitored continuously through the supervisory control and data acquisition (SCADA) system with the feed tank level and pump system checked at least three times per 24-hour period to verify fluoride is feeding normally. Water Production staff can perform bench testing for fluoride when needed and each day a sample of the water entering the distribution system is tested using a certified method at the Environmental Laboratory to ensure ongoing compliance. Current upgrades to the fluoride system include cybersecurity enhancements to the control technology, new and larger storage tanks, and new pumps as part of the ongoing chemical improvement capital project at Olathe's Water Plant.

Like most water systems who fluoridate, fluoride addition at Olathe's Water Plant is achieved by adding Fluorosilicic Acid (FSA), a side stream product of phosphorus mining. Currently, Water Production sources FSA from Harcros Chemical, which distributes for Simplot Phosphates LLC. At a price of $0.408 per pound and with an annual usage in the range of 110,000 lbs, Olathe's chemical costs are approximately $45,000 annually to add fluoride. Although day-to-day costs associated with operating and maintaining the fluoride addition system are minimal, FSA is corrosive to pumps, tanks, and lines and future repair and replacement should be planned for.

Questions as to the future of fluoride regulations were introduced when on September 25, 2024, a potentially significant ruling was issued by Judge Edward Chen in U.S. District Court for the Northern District of California in the case of the Food & Water Watch against the EPA (Case No. 17-CV-02162-EMC). The lawsuit was about whether adding fluoride to drinking water poses an "unreasonable risk" to health, particularly to children's brain development. Judge Chen ruled in favor of the Food & Water Watch, finding that recommended levels of fluoride in drinking water at 0.7 mg/L might pose an unreasonable risk to children's IQ. He was careful to say that his ruling "does not conclude with certainty that fluoridated water is injurious to public health." But that evidence of its potential risk is enough to warrant forcing EPA to take action saying, "In all, there is substantial and scientifically credible evidence establishing that fluoride poses a risk to human health; it is associated with a reduction in the IQ of children and is hazardous at dosages that are far too close to fluoride levels in the

drinking water of the United States." "Specifically, The Court finds that fluoridation of water at 0.7 mg/L – the level presently considered "optimal" in the United States – poses an unreasonable risk of reduced IQ in children. It should be noted that this finding does not conclude with certainty that fluoridated water is injurious to public health; rather, as required by the Amended TSCA, the Court finds there is an unreasonable risk of such injury, a risk sufficient to require the EPA to engage with a regulatory response. This order does not dictate precisely what that response must be. Amended TSCA leaves that decision in the first instance to the EPA. One thing the EPA cannot do, however, in the face of this Court's finding, is to ignore that risk." On January 17, 2025, the EPA filed notice to appeal this ruling without offering an explanation or justification for their decision. How, exactly, these legal actions translate into actual changes in fluoride regulations remains to be seen.

Given the recent court ruling, Olathe, like other communities, is facing questions from concerned residents. While the American Dental Association supports its continuation, citing benefits for oral health, the court ruling has introduced a degree of skepticism about whether the merits of fluoridation outweigh any potential harm. The City of Olathe's message to community members has been consistent and in alignment with neighboring systems who fluoridate; staff are actively monitoring the situation and following current guidance from state and federal regulators. The City is acting in accordance with comprehensive, science-based regulatory advice to ensure that any changes implemented are both effective and appropriate; and that this approach allows the City to balance the public health benefits traditionally associated with fluoridation against the emerging concerns highlighted by the recent court ruling.

References

McMahon, P. B., Brown, C. J., Johnson, T. D., Belitz, K., & Lindsey, B. D. (2020). Fluoride occurrence in United States groundwater. *Science of The Total Environment*, 732, 139217. https://doi.org/10.1016/j.scitotenv.2020.139217

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