

Fluoride in Madison Drinking Water – Background

Madison Water Utility currently adds hydrofluorosilicic acid to Madison tap water to achieve a targeted level of 1.1 mg/L or parts per million (ppm) of fluoride. This level of fluoride addition is consistent with the recommendations of the World Health Organization (WHO), American Medical Association (AMA), Centers for Disease Control (CDC), American Dental Association (ADA), and other professional organizations in the medical community. Although low levels of fluoride are naturally present in Wisconsin groundwater, additional fluoride is added to drinking water to promote dental health.

The US Environmental Protection Agency (EPA), through administration of the Safe Drinking Water Act, has regulatory authority over the permissible level of fluoride in drinking water. In Wisconsin, EPA has granted the Department of Natural Resources (DNR) authority to enforce the Safe Drinking Water Act. EPA has established an enforceable maximum contaminant level (MGL) and maximum contaminant level goal (MCLG) of 4 ppm of fluoride. A non-enforceable secondary MCL for fluoride of 2 ppm was also established to prevent adverse cosmetic effects. Tooth discoloration may result from long-term exposure to water with more than 2 ppm fluoride. Acute toxicity can occur at a level of 30 ppm of fluoride. Symptoms include ...

Water samples are collected daily from each operating well and tested for fluoride. The table below summarizes 2007 fluoride data for water samples collected at Madison wells (8/30).

Well	Samples	Minimum	Mean	Median	Maximum	5th Pct	95 Pct
6	55	0.80	1.16	1.15	1.41	1.00	1.31
7	170	0.04	1.17	1.20	1.76	0.81	1.53
8	100	0.00	1.11	1.15	1.46	0.82	1.33
9	240	0.32	1.15	1.15	2.09	0.89	1.45
11	229	0.23	1.12	1.12	1.57	0.88	1.40
12	205	0.00	1.18	1.21	1.70	0.81	1.48
13	165	0.09	1.04	1.05	1.47	1.05	1.05
14	240	0.11	1.22	1.23	1.92	0.76	1.70
15	238	0.10	1.14	1.15	1.60	0.90	1.35
16	146	0.00	1.07	1.10	1.38	0.79	1.30
17	122	0.00	1.17	1.21	1.59	0.87	1.40
18	235	0.05	1.10	1.12	1.44	0.86	1.31
19	171	0.42	1.21	1.23	1.62	0.96	1.47
20	240	0.67	1.19	1.19	1.66	0.92	1.43
23	127	0.03	1.17	1.19	1.64	0.88	1.40
24	205	0.00	1.19	1.21	1.62	0.96	1.43
25	240	0.00	1.03	1.05	1.51	0.80	1.24
26	239	0.80	1.22	1.23	1.67	0.96	1.47
27	23	0.51	1.13	1.10	1.84	0.57	1.58
28	104	0.05	0.97	1.00	3.50	0.43	1.25
29	2	0.87	0.93	0.93	0.99	0.88	0.98
30	234	0.48	1.09	1.10	1.56	0.87	1.29

DRAFT Standard Operating Procedure – Fluoride Levels (9-12-07)

1. Temporary (less than 72 hours) deviations from “normal operating range” are acceptable if the fluoride level is below 2 ppm.
2. The science says there is not much difference between 1.1 and 1.6 ppm fluoride.
3. Only drain reservoir to reduce fluoride concentration if, after performing a mass balance, adding water to lower the fluoride level to an “acceptable” level is not possible.

Fluoride Range	Actions To Be Taken	Notification
0.0 – 0.6 ppm	<ul style="list-style-type: none"> • Within 72 hours, determine malfunction and repair 	Maintenance
0.6 – 1.6 ppm	NORMAL OPERATING RANGE	
1.6 – 2.0 ppm	<ul style="list-style-type: none"> • Within 72 hours, determine malfunction and repair 	Maintenance
2.0 – 4.0 ppm	<ul style="list-style-type: none"> • Turn off fluoridation system • Add non-fluoride water to reservoir until fluoride level at the unit well is less than 2 ppm • Determine malfunction and repair; restart fluoridation system with supervisor’s permission • Collect six samples from the unit well over 48 hour period to confirm fluoride is back to normal range 	Maintenance General Manager Water Supply Supervisor Water Quality Manager
4.0 – 10.0 ppm	<ul style="list-style-type: none"> • Turn off fluoridation system • Shut off the booster pump, stop the flow of water into the distribution system • Notify supervisor and report the incident to DNR • Issue public notification (see appendix) • Add sufficient volume of non-fluoride water to the reservoir to reduce fluoride concentration to less than 4 ppm; if necessary, drain to waste reservoir water with elevated fluoride • Determine malfunction and repair • Restart fluoridation system and booster pump with supervisor’s permission • Within 48 hours of booster pump restart, collect six samples from the unit well to confirm that fluoride level is back to normal; allow a minimum of four hours between sample collection • Verify that fluoride levels in the distribution system are back to normal operating range (see appendix) 	Maintenance General Manager Mayor’s Office Public Health Alder(s) Water Board Water Utility Staff General Public DNR Water Supply Supervisor Water Quality Manager

<p>>10 ppm</p>	<ul style="list-style-type: none"> • Immediately turn off the fluoridation system • Shut off the booster pump and stop the flow of water into the distribution system • Notify supervisor and report the incident to DNR • Issue public notification (see appendix) • Identify area impacted by elevated fluoride level • Flush the water mains in the affected area(s) until the fluoride level is below 4 ppm • Add sufficient volume of non-fluoride water to the reservoir to reduce fluoride concentration to less than 4 ppm; if necessary, drain to waste reservoir water with elevated fluoride • Determine malfunction and repair; restart fluoridation system, with supervisor's permission • Restart booster pump and allow water to flow into the distribution system • Within 48 hours of booster pump restart, collect six samples from the unit well to confirm that fluoride levels are back to normal; allow a minimum of four hours between sample collection • Collect water samples from the distribution system and test the fluoride content; retest until levels are below the secondary maximum contaminant level • Issue follow-up public notification when situation is back to normal 	<p>Maintenance General Manager Mayor's Office Public Health Alder(s) Water Board Water Utility Staff General Public DNR Flushing Coordinator Water Supply Supervisor Water Quality Manager</p>
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Tasks Needing To Completed:

Create press release drafts when (a) fluoride is greater than 4 ppm but less than 10 ppm and (b) fluoride exceeds 10 ppm. For condition "a", the release will state that the utility will allow the elevated fluoride water to work itself out of the system, which should take between 24-72 hours.

Public Health will provide a statement that describes expected impacts for 2-3 days of exposure to water with fluoride in the 4-10 ppm range and greater than 10 ppm range.

Obtain information to compare fluoride content of 2 liters of water with fluoridated toothpaste.

Identify distribution sample locations to confirm fluoride levels are back to normal. Include a table in an appendix with this information.

Create spreadsheet specific to well that calculates volume of non-fluoridated water needed to dilute elevated fluoride water in the reservoir.

Create an appendix that provides rationale/justification for actions/fluoride breakpoints.

Obtain the 1948 resolution regarding fluoridation of City of Madison tap water.