

Water Utility Board Procedural Guideline			
Title:	GUIDE 8 – Executive Summary of Water Quality Treatment Policies		
Policy Number:	Relates to O-2B	Adopted:	Mar 24, 2015
Category:	Procedural Guideline	Revision #/Date:	1/ Feb 26, 2019 <u>1/ Oct 22, 2019</u>

Note: The following documents contain detailed explanations and rationale for the policies described below.

- [Original Water Quality Treatment Policies – adopted January 27, 2015](#)
- [Monitoring and Treatment Policy Revisions – adopted February 26, 2019](#)

1. Volatile and Synthetic Organic Compounds with a primary Maximum Contaminant Level (MCL) or an Enforcement Standard:

As required by NR 809, quarterly monitoring shall occur if any regulated [Volatile Organic Compound \(VOC\)](#) is detected at a level that exceeds 0.0005 mg/L. When four consecutive quarterly samples exceed a concentration equivalent to 50% of the [Maximum Contaminant Level \(MCL\)](#) or [Enforcement Standard](#)~~ES~~, utility staff shall begin an investigation into feasibility of wellhead treatment, best available technologies ~~[BATs]~~ for VOC reduction, and the source and extent of contamination if not known or previously investigated. At the 80% threshold, staff shall begin a planning process to design and construct a treatment plant to reduce the contaminant level or begin the process to identify a new supply point, free of contamination.

2. Inorganic compounds with a Primary MCL or an Enforcement Standard:

Quarterly monitoring shall occur following detections above one half the MCL or ~~ES~~[Enforcement Standard](#). When four consecutive quarterly samples exceed this benchmark, an investigation into the contaminant source, causes of the elevated concentration, and alternative strategies for contaminant reductions shall begin. Triggers for an investigation will be based on concentrations at the well rather than in the distribution system. Action shall be taken to reduce the contaminant level if it consistently exceeds 80% of the MCL or ~~ES~~[Enforcement Standard](#).

3. Radionuclides with a primary MCL:

Monitor gross alpha, radium, and uranium according to the requirements established by Wisconsin DNR. Detections of any radionuclide above 50 % of the MCL shall trigger quarterly monitoring. If four consecutive quarterly samples exceed this benchmark, staff shall investigate alternatives for contaminant reductions including wellhead treatment, well modifications, and changes to well operations. Source reduction shall be considered if contaminant levels consistently exceed 80% of the MCL.

If after three years of quarterly monitoring results show that combined radium is stable, and not increasing, and the running annual average of quarterly samples is less than 80% of the MCL, or 4 pCi/L, then reduce monitoring to annually and sample during the quarter which

is likely to produce the highest radium result or when the operational condition of the well changes. Monitoring shall increase to quarterly if the results of three consecutive annual samples exceed 4 pCi/L, or any one sample is greater than the MCL, or 5 pCi/L. No sampling shall be required at a well when it is off-line.

4. Iron & Manganese:

Iron and manganese treatment shall be implemented at any well facility where the average annual concentration of iron or manganese exceeds 0.1 mg/L or 0.02 mg/L, respectively. For any well that meets this threshold and requires treatment, the utility shall use asset management principles to rank, according to order of recommended completion, each iron and manganese filtration project against the other projects identified in the long-range capital improvement program.

Significant capital investment will be required to achieve this policy goal. Therefore, the timing of these improvements must be balanced by the affordability goals of the City and Water Utility. Target for complete implementation of filtration is 2045, with high priority wells treated by 2030. These target dates for complete implementation shall be re-evaluated based on their financial feasibility.

Periodic review is expected to occur, at a minimum, once every 5 years. As of 2019, High high priority wells include those with water quality that exceeds the secondary MCL or existing board treatment policies, specifically Well 8 and Well 19. Well 27 could also be high priority based on achieving the complementary benefits described below.

Complementary benefits associated with filtration include

- a. Co-contaminant removal (i.e. radium)
- b. Improved system water quality – fewer biofilms & related taste/odor concerns and less metals adsorption on mineral deposits in water mains
- c. Operational savings – reduced water main cleaning and hydrant flushing
- d. Operational flexibility – unrestricted use of the facility after filtration is added

5. Inorganic compounds, other than iron and manganese, with a Secondary MCL:

Confirmed detections of an inorganic contaminant above one half the SMCL shall trigger an investigation into the contamination source, causes of the elevated concentration, and alternative strategies for reductions. Triggers for an investigation shall be based on concentrations at the well rather than in the distribution system. If the contaminant consistently exceeds 80% of the SMCL, action shall be taken to reduce the contaminant level through wellhead treatment, operations, or source abandonment/new supply.

6. Unregulated contaminants of concern: sodium

Detection of sodium above 30 mg/L at any source shall result in additional monitoring – monthly testing for a period of one year. If the average monthly sodium level is above 30 mg/L, it shall trigger an investigation into the sources and alternative strategies that can reduce the sodium level. If the level exceeds 48 mg/L, staff shall begin the planning process

to design and construct a treatment plant, modify the well to seal off the upper aquifer, or identify a new supply point.

7. Unregulated contaminants of concern: hexavalent chromium

~~Continue monitoring hexavalent chromium at all wells twice per year through 2015. Then, reduce to Perform~~ annual monitoring at wells where hexavalent chromium exceeds 1 µg/L—~~a level that corresponds to one tenth the recently adopted California MCL.~~ All wells shall be tested at least once every three years for hexavalent chromium. Any detection above 5 µg/L shall trigger an investigation into the causes of the elevated concentration and alternative strategies for reductions including operational changes and wellhead treatment. Action may be taken to reduce the contaminant level if it exceeds 8 µg/L.

8. Unregulated contaminants of concern: 1-4 dioxane

A minimum of triennial monitoring shall be conducted at each well in which 1,4-dioxane was detected in the past or there is a reasonable likelihood of it being detected (e.g. a new detection of a chlorinated solvent at an existing well). The reference level of 0.35 ug/L (US EPA's 10-6 lifetime cancer risk level) shall be the basis for more frequent monitoring; test results consistently above this level shall trigger semi-annual testing.

9. Unregulated contaminants of concern: per and polyfluoroalkyl substances (PFAS)

Any testing for PFAS shall follow a modified US EPA Method 537, or similar procedure, that includes analysis for the presence of at least twelve targeted PFAS, including PFOA and PFOS, and at minimum reporting levels of no higher than 2 ng/L for each PFAS. A minimum of triennial monitoring shall occur at each well where at least one PFAS was detected or there is a reasonable likelihood of a PFAS being detected. The utility shall conduct annual monitoring at each well in which the combined PFAS concentration exceeds the health reference level.

10. Other unregulated or emerging contaminants

The utility's Water Quality Technical Advisory Committee occasionally may identify new or emerging contaminants for testing. Typically, the contaminants will come from US EPA's Contaminant Candidate List (CCL) or the Unregulated Contaminants Monitoring Program. The utility shall maintain a budget to accommodate the unexpected need to test for new or emerging contaminants. The Technical Advisory Committee shall provide guidance as to the contaminants that should be tested and the frequency of testing, which will generally adhere to the following:

- a. **Initial monitoring** – Monitor each well twice to establish a baseline level at each well. The committee may recommend a subset of wells for monitoring based on the likelihood that the contaminant of concern will be detected.
- b. **Subsequent monitoring** – Conduct annual testing for a minimum of three years at any well where the contaminant is detected above a reference level. Wells where the contaminant is detected below the reference level shall be tested no less frequently than once every three years.
- c. **Reduced monitoring** – Monitoring may be reduced to once every three years if the contaminant concentration is found to be stable and not increasing.

Water Quality Treatment Targets:

The decision to add treatment reflects the utility's desire to reduce public health risk associated with a known contaminant or to improve the aesthetic quality of drinking water. Because the capital investment required to implement treatment is significant, operation of these facilities shall maximize the benefits of that investment.

Below are non-enforceable treatment targets at the well in which water treatment is implemented; these targets are for the individual well and should not be applied to the water system as a whole.

- A. Facilities designed specifically to reduce **radium** (i.e. treatment that employs the addition of hydrous manganese oxide [HMO]) shall be operated to lower the combined radium (Ra-226 + Ra-228) to below 0.5 MCL (2.5 pCi/L).
- B. For **all other primary contaminants**, treatment facilities shall be designed and operated to reduce the contaminant down to the public health goal (MCLG) or 0.5 MCL, whichever is lower. If an MCLG is zero, the target shall become the detection limit for that contaminant.
- C. Facilities to remove **iron and manganese** shall be designed to reduce the level to below 0.1 mg/L iron and 0.02 mg/L manganese; however, these facilities may be operated at lower removal efficiencies if water quality objectives are sustained while other benefits are achieved (e.g. energy conservation).
- D. For **all other secondary contaminants**, treatment facilities shall be designed and operated to reduce the contaminant to below 0.5 SMCL.
- E. For an **unregulated contaminant with an established health reference level**, and a decision has been made to add treatment, the facility shall be designed and operated to reduce the contaminant to below that established reference level.

See Figure 1 on the following page for a decision tree on the water quality treatment targets.

Figure 1. Decision Tree for Water Quality Treatment Target Levels

