

A. Testing Requirements –

Regulated Contaminants: Water Utility Board (WUB) policy requires more frequent testing if a regulated contaminant, measured at the entry point to the distribution system, tests higher than 50% of the Maximum Contaminant Level (MCL) or the Enforcement Standard (ES) in NR 140. According to this policy, quarterly monitoring replaces annual or less than annual testing.

The Department of Natural Resources (DNR) has requirements that are more stringent when a volatile organic compound (VOC) is “detected” – defined as exceeding 0.0005 mg/L. In this case, quarterly monitoring is required; however, the department may reduce monitoring to an annual basis if the department determines that the source “is reliably and consistently below the MCL.” [NR 809.245(6) (b)]

Similarly, DNR code requires increased monitoring (from annual to quarterly) for nitrate and nitrite when the concentration exceeds one-half the MCL. This requirement matches current WUB policy. There is no corresponding regulatory requirement to increase monitoring when any other regulated contaminant measures above one-half the MCL.

The regulatory requirement for frequency of radium monitoring (every three, six, or nine years) at a given well depends on whether radium is detected above or below one-half the MCL.

- Recommendation #1 – Modify the policy for radium monitoring as follows: 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.

Emerging or New Contaminants of Concern (Unregulated): Policies of the Water Utility Board mandate the maintenance of an annual budget to test for new or emerging contaminants. The Water Quality Technical Advisory Committee makes recommendations on which contaminants to test and at what frequency. Previously, guidance for hexavalent chromium monitoring was developed and approved. New guidelines for 1,4-dioxane and PFAS (per- and polyfluoroalkyl substances) are proposed here.

- Recommendation #2 – Add dioxane monitoring as follows: 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.
- Recommendations #3 – Add PFAS monitoring as follows: 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 federal health reference level.

- Recommendation #4 – 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. Add the following monitoring requirements for any new or emerging contaminant identified by the committee:
 - 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.

B. Iron and Manganese Standards for Treatment

Previously, the Water Utility Board adopted two iron and manganese treatment standards. The first established that all Madison wells shall meet secondary drinking water standards for iron and manganese (0.3 and 0.05 mg/L, respectively). Further, any new source of supply shall have lower levels – below 0.1 mg/L iron and 0.02 mg/L manganese – with filtration included in the design of the facility if either metal is above these limits. The second policy, adopted in 2015, directs staff to develop plans for the implementation of filtration at an existing well facility if the untreated water exceeds 0.24 mg/L iron or 0.04 mg/L manganese.

- Recommendation #5 – Modify and incorporate the iron and manganese treatment standards into a single, uniform policy as follows: *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.

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

C. Water Quality Treatment Goals –

In 2015, when the Water Utility Board established the Water Quality Treatment Policies, these policies provided guidance on what contaminant levels were deemed acceptable and directed staff to take action when these levels were exceeded. However, these policies did not explicitly state any treatment level goals. In other words, when provided, what level of treatment is deemed acceptable – below detection or some other level that is below the MCL or SMCL? Below are proposed 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. It should be noted that Best Available Technology, especially for treatment of new or emerging contaminants, may not be capable of completely eliminating the contaminant, and that detection limits are continually being improved.

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 by reducing the level of a contaminant that can discolor the water or impart an unacceptable taste to the water. Because the capital investment required to implement treatment is significant, operation of these facilities shall maximize the benefits of that investment.

- Recommendation #6 – Water Quality Treatment Targets are proposed as follows:
 - ❖ 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).
 - ❖ 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.

- ❖ 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).
- ❖ For all other secondary contaminants, treatment facilities shall be designed and operated to reduce the contaminant to below 0.5 SMCL.
- ❖ 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.

A decision tree is presented as Figure 1 on the following page.

