MEMORANDUM

LEGISLATIVE REFERENCE BUREAU

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To: Ald. James A. Bohl, Jr.

From: Tea Norfolk, Legislative Fiscal Analyst – Lead

Date: October 3, 2016

Subject: Lead Leaching into Stagnant Water and Suggested Flushing Time

This memo is in response to your request to provide information regarding the rate at which lead accumulates in water by means of leaching over a period of time. This question is prompted by the suggested flushing time with respect to lead leaching into stagnant water.

The Milwaukee Water Works (MWW) recommends flushing water lines by means of running water until it is noticeably cold, usually approximately one to two minutes, after the water has been stagnant for at least six hours. This period of time is based on recommendations by the Environmental Protection Agency (EPA) and the Centers for Disease Control (CDC).

According to the EPA, the amount of lead that leaches into water over a given period of time is dependent on several factors, including:

- the chemistry of the water (acidity, alkalinity, corrosiveness) and the types and amounts of minerals in the water;
- the amount of lead it comes into contact with;
- the temperature of the water;
- the age and amount of wear in the pipes;
- how long the water stays in pipes;
- composition of the pipes;
- volume of water in the pipes; and
- the presence of protective scales or coatings inside the plumbing materials.

Leaching is a broad category that includes the dissolution of a variety of metals and chemicals into drinking water. In some instances, it is difficult to differentiate between corrosion and leaching.

According to a 2000 study published by D.A. Lytle and M.R. Schock in the Journal of Water Supply, “Impact of stagnation time on metal dissolution from plumbing materials

in drinking water," the EPA based its six-hour timeframe on a "worst case" lead or copper exposure period. In 1940, researchers found that copper levels increased to a maximum value under some experimental conditions in as little as two to three hours. In Schock's review of investigations related to lead pipe, researchers most often found that lead levels in treated drinking water rapidly increased and reached equilibrium at approximately "overnight" periods of stagnation. The rapidity of the increase was somewhat variable over the first few hours of stagnation and dependent on a variety of factors, as listed above. Thus, a minimum stagnation time of six hours was required to represent the maximum level of lead in water for testing purposes.

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