

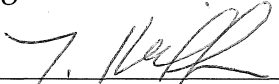
# Internal Monitoring Report

**Policy #:** O-2B Water Quality

**Monitoring Frequency:** Quarterly

**Date:** April 23, 2013

I certify that the following information is true.

Signed , General Manager

## Policy Language:

Madison Water Utility consumers will receive high quality water that meets or is better than all primary and secondary drinking water standards, including their public notification requirements, and complies with board-adopted water quality goals, incorporated by attachment.

The Madison Water Utility recognizes that drinking water standards are subject to revision and that new compounds of concern will be determined. This dynamic is a result of health studies being conducted by health organizations and government agencies on the state, national and international level. The technology to quantify compounds at increasingly minute levels is constantly improving.

The Madison Water Utility shall maintain and promulgate a Watch List of compounds of concern by unit well of compounds that are increasing and may approach the primary and secondary drinking water standards. The Watch List shall identify which wells require action.

## General Manager's interpretation and its justification:

Few things are more vital to a community than the availability of high quality drinking water. It promotes public health, public safety, and the economic interests of our community. To that end, the water utility will consistently deliver water that meets the primary, health-based drinking water standards, the secondary (aesthetic) standards, and the additional policy goals established by the Board. The Water Utility Procedural Guideline GUIDE 3, which establishes policies regarding iron and manganese, contains the following:

The Madison Water Utility, under normal operating conditions, shall provide water that contains less than the National Secondary Drinking Water Standard for Fe (currently 0.3 mg/L) and Mn (currently 0.05 mg/L) at the customer's tap.

I interpret this to mean that 95<sup>th</sup> percentile results from our routine distribution water quality monitoring program shall be less than these values for iron and manganese.

Utility staff will remain vigilant in following developments related to currently unregulated and emerging contaminants like pharmaceuticals, endocrine disruptors, and chromium-6 that may pose problems in the future. Furthermore, the utility will employ multiple methods to adequately inform its consumers of the safety and quality of their drinking water including the federally-required Consumer Confidence Report (CCR), the water utility website, e-mail distribution lists, neighborhood listservs, citizen meetings, and through staff contact in the field and office.

## Data directly addressing the General Manager's interpretation:

Primary Drinking Water Contaminants:

None of the 831 water samples collected between January and March had coliform bacteria present. Samples were collected from routine monitoring points in the distribution system and showed satisfactory chlorine levels.

Nine wells were tested in either January or February for volatile organic compounds (VOC). PCE was found at six wells and TCE was identified in three of these wells. All detections were below the maximum contaminant level (MCL). These six wells previously showed the presence of at least one VOC. Test results are shown below. None of 47 VOCs tested were detected at the three other wells; however, by-products of drinking water chlorination [trihalomethanes] were observed at some wells.

VOLATILE ORGANIC COMPOUNDS	UNITS	MCL	6	9	11	14	15	18
			1/23	1/23	1/23	1/23	2/27	1/23
1,2-Dichloroethylene (cis)	Ppb	70	<0.13	<0.13	[0.37]	<0.13	<0.20	<0.13
Tetrachloroethylene [PCE]	Ppb	5	0.66	1.3	[0.42]	[0.50]	2.6	0.94
Trichloroethylene [TCE]	Ppb	5	<0.19	<0.19	[0.26]	[0.23]	[0.35]	<0.19
Trichlorofluoromethane	Ppb	--	<0.13	<0.13	0.81	<0.13	<0.16	<0.13

Construction of a treatment facility to remove VOC from water at Well 15 is on-going. The plant is expected to be operational in July.

Policy Goals for Iron and Manganese:

Routine distribution testing from January through March showed that all 86 samples met the policy goals for iron and manganese. The table below shows summary statistics for the first quarter.

**Manganese, µg/L**

	Jan – Mar	Year-to-Date
<b>Policy Goal</b>	50	50
<b>Median</b>	2.5	2.5
<b>Average</b>	4.0	4.0
<b>95<sup>th</sup></b>	<b>12</b>	<b>12</b>
<b>Maximum</b>	44	44
<b>Count</b>	86	86
<b>&gt;50</b>	0	0

**Iron, mg/L**

	Jan - Mar	Year-to-Date
<b>Policy Goal</b>	0.3	0.3
<b>Median</b>	0.01	0.01
<b>Average</b>	0.02	0.02
<b>95<sup>th</sup></b>	<b>0.11</b>	<b>0.11</b>
<b>Maximum</b>	0.25	0.25
<b>Count</b>	86	86
<b>&gt;0.3</b>	2	2

Unregulated and Emerging Contaminants:

In February, the utility performed additional UCMR3 pre-screening to confirm the detections of 1,1-dichloroethane at Well 9 and 1,4-dioxane at Well 11 from tests done in December. In addition, testing for 1,4-dioxane was expanded to include Wells 9 and 15 - wells with previous detections of man-made organic contaminants. The chemical was detected at both wells ranging in concentration from 0.12-0.17 µg/L. As recommended by the Water Quality Technical Advisory Committee, tests will be conducted for 1,4-dioxane at each well this year. A total of four wells (#9, #11, #14, and #15) had measurable amounts of 1,4-dioxane.

The utility continues to monitor all wells twice per year for chromium-6. All seventeen wells currently in operation have been sampled at least once this year. Results ranged from below detection (<0.02 µg/L) at three wells to 1.87 µg/L. In most cases, chromium-6 measured below 1 ppb. Highest levels of chromium-6 are observed at Wells 6 and 14.

The utility is partnering with Madison Metropolitan Sewerage District on a chloride reduction initiative that involves optimization of existing water softeners and installation of high-efficiency units. Objectives of the pilot study include assessing the impact on wastewater chloride levels under these scenarios and their effect on water use during regeneration.

#### Public Outreach on Water Quality:

Routine updates continue to be made to the website when new water quality data are available. These updates include inorganic, volatile organic, chromium-6, and other unregulated contaminant test results.

A draft of the Annual Drinking Water Quality Report, also called the Consumer Confidence Report (CCR), has been completed and is being reviewed by staff for improvements. The final report is expected to be available on our website by the first week of May. Due to a rule change, the utility is forgoing the printing and mailing of 110,000 paper copies of the report. Instead, electronic delivery of the annual report is planned. Paper copies will still be available upon request.

#### I report compliance.

#### **Attachments:**

Water Quality Watch List

**Madison Water Utility  
Water Quality Watch List**

**Organics - Regulated**

Contaminant	Maximum*	Units	MCLG	PAL	MCL	Detects Below PAL <sup>%</sup>	Watch List	Action Plan	Reference
1,2-Dichloroethane	[0.17]	µg/L	zero	0.5	5	#17	none		NR 140.10
1,2-Dichloroethylene (cis)	[0.40]	µg/L	70	7	70	#8, #9, #11, #14	none		NR 140.10
Ethylbenzene	[0.14]	µg/L	700	140	700	#225	none		NR 140.10
Tetrachloroethylene [PCE]	3.9	µg/L	zero	0.5	5	#6, #27	#9, #11, #14, #15, #18	#15 - Low-profile Air Stripper, Groundwater Investigation; #11, #14, #18 - Budget One GW Investigation per Year	NR 140.10
Toluene	2.2	µg/L	1000	160	1000	#15, #18, #25	none		NR 140.10
1,1,1-Trichloroethane	[0.29]	µg/L	200	40	200	#9, #18	none		NR 140.10
Trichloroethylene [TCE]	0.43	µg/L	zero	0.5	5	#11, #14, #15, #18, #27	none		NR 140.10
Xylene, Total	1.5	µg/L	10000	400	10000	#225	none		NR 140.10

\* Maximum detection observed at any Madison well from 2009 through 2013

<sup>%</sup> Detected in at least one sample collected from 2009 through 2013

**Organics - Unregulated**

Contaminant	Maximum*	Units	MCLG	PAL	ES	Wells with Detects <sup>%</sup>	Watch List	Action Plan	Reference
Dichlorodifluoromethane	[0.23]	µg/L	n/a	200	1000	#14	none		NR 140.10
1,1-Dichloroethane	0.07	µg/L	n/a	85	850	#9	none		NR 140.10
1,4-Dioxane	0.63	µg/L	n/a	0.3	3	#9, #11, #14, #15	#11, #14	Monitor	NR 140.10
Methyl t-butyl ether [MTBE]	[0.14]	µg/L	n/a	12	60	#15	none		NR 140.10
Trichlorofluoromethane	1.3	µg/L	n/a	698	3490	#11	none		NR 140.10
1,2,4-Trimethylbenzene	0.64	µg/L	n/a	96	480	#7, #15	none		NR 140.10
1,3,5-Trimethylbenzene	[0.20]	µg/L	n/a	96	480	#15	none		NR 140.10

\* Maximum detection observed at any Madison well from 2009 through 2013

<sup>%</sup> Detected in at least one sample collected from 2009 through 2013

**Radionuclides**

Contaminant	Maximum	Units	MCLG	Watch	MCL	Wells with Detects	Watch List	Action Plan	Reference
Gross alpha	13.8	pCi/L	zero	5	15	All Wells	#7, #13, #19, #25, #27, #28, #30	Monitor	NR 809.50
Gross beta	14.8	pCi/L	zero	10	50	All Wells	#19, #28	Monitor	NR 809.50
Combined Radium	5.8	pCi/L	zero	2	5	All Wells	#7, #8, #15, #19, #27, #28, #30	Monitor	NR 809.50
Uranium	2.0	(ug/L)	zero	3	30	All Wells	none		NR 809.50

ES - Enforcement Standard (NR 140 - Groundwater Quality)

MCL - Maximum Contaminant Level (Legal Limit)

MCLG - MCL Goal (Public Health Goal)

PAL - Preventive Action Limit (NR 140 - Groundwater Quality)

**Madison Water Utility  
Water Quality Watch List**

**Inorganics - Regulated**

Substance	Maximum*	Units	MCLG	PAL	MCL	Detects Below PAL	Watch List	Action Plan	Reference
Arsenic	1.2	(ug/l)	zero	1	10	#6, #7, #8, #13, #17, #19, #27, #28, #30	#23	Monitor	NR 140.10
Barium	53	(ug/l)	2000	400	2000	All Wells	none		NR 140.10
Chromium	2.8	(ug/l)	100	10	100	All Wells	none		NR 140.10
Copper	58	(ug/l)	1300	130	1300	All Wells	none		NR 140.10
Lead	9.2	(ug/l)	zero	1.5	15	#7, #8, #9, #15, #16, #17, #19, #23, #24, #27, #28	#20	Monitor	NR 140.10
Nickel	3.7	(ug/l)	100	20	100	All Wells	none		NR 140.10
Nitrogen-Nitrate	3.9	(mg/l)	10	2	10	#9, #12, #18, #20, #25, #27, #29	#6, #11, #13, #14, #15, #16, #23, #26	Monitor	NR 140.10
Nitrogen-Nitrite	0.08	(mg/l)	1	0.2	1	#7	none		NR 140.10
Selenium	1.1	(ug/l)	50	10	50	#6, #9, #11, #13, #14, #15, #16, #23, #25, #27, #29	none		NR 140.10
Thallium	0.3	(ug/l)	0.5	0.4	2	#11, #12, #15, #17, #19, #23, #27	none		NR 140.10

\* Based on 2012 annual test data

**Inorganics - Unregulated**

Substance	Maximum*	Units	MCLG	Watch	SMCL	Wells with Detects	Watch List	Action Plan	Reference
Aluminum	2.6	(ug/l)	n/a	50	200	All Wells	none		NR 809.70
Chloride	109	(mg/l)	n/a	125	250	All Wells	none		NR 809.70
Iron	0.58	(mg/l)	n/a	0.1	0.3	All Except #9, #11, #12, #14, #16	#7, #8, #19, #20, #23, #24, #27, #28, #30	#7 - Install Filtration (2013), #8 - Install Filtration (2014), #19 - Install Filtration (2016), #30 - Install Filtration (2018)	NR 809.70
Manganese	90	(ug/l)	n/a	20	50	All Except #14	#7, #8, #17, #19, #23, #24, #26, #27, #28	#7 - Install Filtration (2013), #8 - Install Filtration (2014), #19 - Install Filtration (2016)	NR 809.70
Sodium	37	(mg/l)	n/a	10	20	All Wells	#6, #9, #11, #13, #14, #15, #16, #17, #23, #27	Monitor	EPA DWEL
Sulfate	55	(mg/l)	n/a	125	250	All Wells	none		NR 809.70
Zinc	194	(ug/l)	n/a	2500	5000	All Wells	none		NR 809.70

\* Based on 2012 annual test data

MCL - Maximum Contaminant Level (Legal Limit)  
DWEL - Drinking Water Equivalency Level

MCLG - MCL Goal (Public Health Goal)

PAL - Preventive Action Limit (NR 140 - Groundwater Quality)

SMCL - Secondary MCL (Aesthetic Guideline)