

Internal Monitoring Report

Policy #: O-2B Water Quality
Frequency: Quarterly

Date: October 23, 2012

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 95th 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:

Of the 973 samples collected between July and September, two were found to be coliform-positive. However, coliform bacteria were not confirmed at either sample location upon re-sampling. Wisconsin Administrative Code NR 809 requires that the utility collect 150 monthly distribution samples and not more than 5% of the samples test positive for coliform bacteria.

All twenty-two wells were sampled in either June or July for a broad suite of over 30 inorganic parameters including arsenic, nitrate, lead, iron, and manganese. The results have been incorporated into the updated Water Quality Watch List, included with this report, and posted to our website.

Well 19 is currently monitored twice per quarter due to an elevated level of radium observed in July 2011. Since January, the radium level has ranged from 2.0 to 3.9 pCi/L. The latest result, from a sample collected in July, measured 3.6 pCi/L compared to the MCL of 5 pCi/L. The utility’s Water Quality Technical Advisory Committee recommended reduced monitoring if the radium level stays below the MCL for the remainder of the year.

Five wells (9, 11, 14, 15, and 18) are currently tested quarterly for volatile organic compounds (VOC) based on previous detections. Each well was sampled in July with results shown on the next page. PCE and TCE are found in all five wells except for Well 9 where TCE has not been detected. The PCE concentration ranged from 0.38 parts per billion [ppb] in Well 11 to 2.9 ppb in Well 15. All VOC detections are below the regulatory limit. The table below does not include the results for trihalomethanes (THM), compounds that form as a result of drinking water chlorination.

VOLATILE ORGANIC COMPOUNDS	UNITS	MCL	9	11	14	15	18
			7/24	7/24	7/25	7/24	7/24
Dichlorodifluoromethane	ppb	--	<0.11	<0.11	[0.20]	<0.11	<0.11
1,2-Dichloroethylene (cis)	ppb	70	<0.13	[0.34]	<0.13	<0.13	<0.13
Tetrachloroethylene [PCE]	ppb	5	1.3	0.38	0.42	2.9	1.1
Trichloroethylene [TCE]	ppb	5	<0.12	[0.24]	[0.22]	[0.34]	[0.18]
Trichlorofluoromethane	ppb	--	<0.12	0.92	<0.12	<0.12	<0.12

Previously, a consultant was hired to design a treatment facility to remove VOCs from water at Well 15; construction of the facility is anticipated to begin next month.

An additional five wells were tested for VOC in July. Low levels of *cis* 1,2-dichloroethylene (Well 8), PCE (Well 27) and TCE (Well 27) were found at levels similar to previous testing. Trihalomethanes were also detected at some wells.

Policy Goals for Iron and Manganese:

Routine distribution testing from July through September showed none of the 84 samples tested above the iron or manganese policy goals. See the table below for summary statistics.

Manganese, ppb			Iron, ppm		
	Jul - Sep	Apr - Jun		Jul - Sep	Apr - Jun
Policy Goal	50	50	Policy Goal	0.3	0.3
Median	2.7	2.3	Median	0.01	0.01
Average	4.6	4.8	Average	0.02	0.04
95th	17	20	95th	0.09	0.14
Maximum	44	63	Maximum	0.21	0.65
Count	84	83	Count	84	83
>50	0	1	>0.3	0	1

Unregulated and Emerging Contaminants:

Chromium-6

Chromium monitoring continues on a semi-annual basis at all Madison wells; five were sampled in September. Test results continue to show that total chromium levels are below the current regulatory limit, hexavalent chromium is the primary chromium species in Madison-area groundwater, and wells that draw their water from the upper aquifer have measurable amounts of chromium (total and hexavalent) while those cased through the Eau Claire formation do not have detectable chromium (<0.02 µg/L).

The study conducted in collaboration with the Wisconsin Geological and Natural History Survey concluded that naturally occurring solid phase chromium is present in the upper and lower bedrock aquifers; however, chromium is only mobile under geochemical conditions present in the upper aquifer and not the deeper Mt. Simon aquifer. The results of this work will be presented at the 2012 American Water Works Association (AWWA) Water Quality and Technology Conference in November. In addition, the water quality manager participated in a panel discussion at the WWA Annual Conference and Exposition in September.

Public Outreach on Water Quality:

An update was posted to our website and the Water Quality listserv in October. Currently, there are over 700 subscribers on this listserv. Also, routine updates are made to the website when new water quality data become available. These updates include inorganic, volatile organic, radionuclide, and chromium-6 test results.

Water quality staff participated in the Project H2O open houses, which were held in September, answering questions about water quality and distributing literature on residential cross connection hazards and how they can be eliminated. Staff also hosted a follow-up information meeting for private well owners to discuss proposed changes to the private well ordinance and to receive feedback on the proposal.

I report compliance.

Attachment:

Water Quality Watch List

**Madison Water Utility
Water Quality Watch List**

Organics - Regulated

Contaminant	Maximum*	Units	MCLG	PAL	MCL	Detects Below PAL %	Watch List	Action Plan	Reference
1,2-Dichloroethane	[0.17]	(ug/l)	zero	0.5	5	#17	none		NR 140.10
1,2-Dichloroethylene (cis)	[0.40]	(ug/l)	70	7	70	#8, #9, #11, #14	none		NR 140.10
Ethylbenzene	[0.14]	(ug/l)	700	140	700	#225	none		NR 140.10
Tetrachloroethylene [PCE]	3.9	(ug/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	(ug/l)	1000	160	1000	#15, #18, #25	none		NR 140.10
1,1,1-Trichloroethane	[0.29]	(ug/l)	200	40	200	#9, #18	none		NR 140.10
Trichloroethylene [TCE]	0.43	(ug/l)	zero	0.5	5	#11, #14, #15, #18, #27	none		NR 140.10
Xylene, Total	1.5	(ug/l)	10000	400	10000	#115, #225	none		NR 140.10

* Maximum detection observed at any Madison well from 2008 through 2012 % Detected in at least one sample collected from 2008 through 2012

Organics - Unregulated

Contaminant	Maximum*	Units	MCLG	PAL	ES	Wells with Detects %	Watch List	Action Plan	Reference
Chloromethane	3.8	(ug/l)	n/a	3	30	#15	#15	Monitor	NR 140.10
Dichlorodifluoromethane	[0.26]	(ug/l)	n/a	200	1000	#14	none		NR 140.10
Methyl t-butyl ether [MTBE]	[0.14]	(ug/l)	n/a	12	60	#15	none		NR 140.10
Trichlorofluoromethane	1.3	(ug/l)	n/a	698	3490	#11	none		NR 140.10
1,2,4-Trimethylbenzene	0.64	(ug/l)	n/a	96	480	#7, #15	none		NR 140.10
1,3,5-Trimethylbenzene	[0.20]	(ug/l)	n/a	96	480	#15	none		NR 140.10

* Maximum detection observed at any Madison well from 2008 through 2012 % Detected in at least one sample collected from 2008 through 2012

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) MCLG - MCL Goal (Public Health Goal) PAL - Preventive Action Limit (NR 140 - Groundwater Quality) SMCL - Secondary MCL (Aesthetic Guideline)
DWEL - Drinking Water Equivalency Level