Internal Monitoring Report

Policy #: O-2B Water Quality **Date**: January 29, 2013
Frequency: Quarterly

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 896 water samples collected between October and December, three had coliform bacteria present. Coliforms, including *E. coli*, were confirmed present in raw water pumped at Well 14; however, they were not detected in treated water delivered to the distribution system. The detection of coliforms at Well 26 was not confirmed upon re-sampling or other testing in the distribution system. All samples collected from routine monitoring locations showed adequate chlorine levels and they were free of coliforms. In 2012, 3771 water samples (2883 – distribution; 888 – wells) were tested for bacteria.

Twice quarterly monitoring of radium continued during the fourth quarter at Well 19 following an elevated radium level observed in July 2011. Since January, the radium level has varied from 2.0 to 4.8 pCi/L. The December sample result measured 2.7 pCi/L compared to the MCL of 5 pCi/L. The Water Quality Technical Advisory Committee has recommended reducing the monitoring frequency for radium at this well.

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 October with results shown on the next page. PCE and TCE were detected in all five wells except for Well 9 where TCE is not found. The PCE concentration ranged from 0.44 parts per billion [ppb] in Well 11 to 3.4 ppb in Well 15. All VOC detections are below the regulatory limit.
The table below does not include the results for trihalomethanes, which were found at low levels at Well 9. Trihalomethanes are substances that form as a result of drinking water chlorination.

VOLATILE ORGANIC COMPOUNDS	UNITS	MCL	9	11	14	15	18
			10/10	10/10	10/17	10/10	10/10
Dichlorodifluoromethane	ppb	--	<0.11	<0.11	**[0.11]**	<0.11	<0.11
1,2-Dichloroethylene (cis)	ppb	70	<0.13	**[0.33]**	<0.13	<0.13	<0.13
Tetrachloroethylene [PCE]	ppb	5	**1.5**	**0.44**	**0.54**	**3.4**	**0.9**
Trichloroethylene [TCE]	ppb	5	<0.12	**[0.23]**	**[0.24]**	**[0.40]**	**[0.16]**
Trichlorofluoromethane	ppb	--	<0.12	**0.72**	<0.12	<0.12	<0.12

Construction of a treatment facility to remove VOCs from water at Well 15 is on-going. The plant is expected to be operational later this summer.

Well 6 was also tested for VOCs in October. The only detection there was low level (0.38 µg/L) presence of PCE.

Policy Goals for Iron and Manganese:

Routine distribution testing from October through December showed two of 86 samples tested above the iron policy goal while none tested over the manganese policy goal. See the table below for summary statistics for the fourth quarter as well as the year.

Manganese, µg/L

	Oct - Dec	Jan - Dec
Policy Goal	50	50
Median	2.7	3.0
Average	4.5	5.1
95th	***16***	***18***
Maximum	27	66
Count	86	337
>50	0	2

Iron, mg/L

	Oct - Dec	Jan - Dec
Policy Goal	0.3	0.3
Median	0.01	0.02
Average	0.04	0.04
95th	***0.19***	***0.15***
Maximum	0.46	0.65
Count	86	337
>0.3	2	4

For the year, the 95th percentile iron and manganese levels were 0.15 mg/L and 18 µg/L, respectively – well below the policy goals. Slightly more than 1% (4) of the 337 samples tested exceeded the iron policy goal; less than 1% (2) exceeded the manganese benchmark.

Unregulated and Emerging Contaminants:

In December, the utility took advantage of an opportunity to perform UCMR3 pre-screening at a reduced cost. Twenty-eight chemicals have been identified by US EPA for monitoring by water utilities across the country between 2013 and 2015. They include hexavalent chromium and other metals, hormones, currently unregulated organic contaminants, and perfluorinated compounds. Two wells, #11 and #14, were sampled for all twenty-eight chemicals while nine other wells were monitored for one or more classes of compounds. None of the hormones (7) or perfluorinated compounds (6) was found at the six wells tested. With one exception, none of the seven VOCs were found at the nine wells that were sampled; only 1,1-dichloroethane was detected at the 0.06 µg/L level at well #9. Also, 1,4-dioxane was found at two of the four wells tested. Chromium results were consistent with those observed from testing over the last two years. Finally, strontium (75-100 µg/L) was detected in all six wells sampled and cobalt was found only at well #19 at 1.7 µg/L. Madison will monitor for all twenty-eight chemicals, twice at each well and at seven distribution locations, in 2015, as required by Unregulated Contaminants Monitoring Rule 3 (UCMR3).

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.

The water quality reports for each well, which are updated annually, are currently being revised to reflect 2012 water quality monitoring results. These reports will be posted to the website when they are complete.

Attachment:

Water Quality Watch List, January 2013

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