

Water Quality Monitoring Report 2008 Monitoring Schedule



Monthly Report for: Jan-09

Analyte Group	Sample Locations	Monitoring Requirements (# of Samples)		Monitoring Activity (# of samples)		Violations & Public Notices
		Monitoring Period	2008 Annual Requirement	Current Month	Year to Date 2008	Year to Date
Daily/Routine Samples						
Coliform Bacteria	Operating Wells and Distribution Sites	150	1800	343	4692	0
Free Chlorine Residual "Grab" Samples	Operating Wells and Distribution Sites	160 ¹	1900 ¹	623	8211	0
Fluoride	Operating Wells	450 ¹	5400 ¹	408	5411	0
Quarterly Samples						
Volatile Organic Compounds (41 analytes)	Wells	4 ¹	16 ¹	0	18	0
Coliform Bacteria (Raw Water)	Wells	21 ¹	84 ¹	0	87	0
Annual Samples						
Inorganic Contaminants ² (28 analytes)	Wells	21	21	0	23	0
Volatile Organic Compounds ² (41 analytes)	Wells	17	17	0	17	0
Disinfection Byproducts - Total Trihalomethanes & Haloacetic Acids	Distribution Sites	7	7	0	7	0
Specialty Samples						
Synthetic Organic Compounds (2 analytes)	Wells	1	1	0	1	0
Radionuclides (4 analytes)	Wells	21	21	0	54	0
Unregulated Contaminants (UCMR2 - 25 analytes)	Wells	22	22	0	22	0
	Distribution Sites	7	7	0	7	0
Iron & Manganese	Wells	na	na	6	155	na
	Residential Taps	na	na	9	81	na

(1) Sampling requirement will vary depending on the number of wells in operation during specific days or quarters

(2) Sampling is usually completed June to September in each calendar year, with results reported in the month following sampling.

Calls Logged to the Water Quality Correspondence Database - 2008
Update: 1/10/09

Year	Month	All Calls	Color	Manganese	Pressure	Taste	Odor	No Water	Other
2008	January	69	41	1	1	7	5	1	17
2008	February	41	18	4	2	1	1	0	19
2008	March	84	54	2	7	4	5	0	18
2008	April	131	78	4	5	6	6	6	35
2008	May	126	68	3	5	7	10	10	40
2008	June	119	66	3	20	2	4	3	29
2008	July	125	68	1	7	3	12	6	32
2008	August	66	46	1	4	2	7	0	12
2008	September	93	50	2	9	7	7	1	26
2008	October	59	26	1	3	2	3	1	26
2008	November	62	42	1	8	0	4	0	8
2008	December	36	19	0	0	4	4	0	10
2008	TOTAL	1011	576	23	71	45	68	28	272

Year	Month	All Calls	Color	Manganese	Pressure	Taste	Odor	No Water	Other	Alder District
2008	December	1	1	0	0	0	0	0	0	01
2008	December	1	1	0	0	0	0	0	0	02
2008	December	5	2	0	0	1	0	0	2	04
2008	December	3	2	0	0	1	0	0	0	05
2008	December	3	0	0	0	0	0	0	3	06
2008	December	1	0	0	0	0	0	0	1	09
2008	December	1	1	0	0	0	0	0	0	11
2008	December	7	4	0	0	2	2	0	0	12
2008	December	1	1	0	0	0	0	0	0	13
2008	December	4	3	0	0	0	0	0	1	14
2008	December	2	1	0	0	0	0	0	1	16
2008	December	1	0	0	0	0	1	0	0	17
2008	December	1	0	0	0	0	0	0	1	18
2008	December	4	2	0	0	0	1	0	1	19
2008	December	1	1	0	0	0	0	0	0	20

Year	Month	All Calls	Color	Manganese	Pressure	Taste	Odor	No Water	Other	Alder District
2008	November	1	0	0	0	0	0	0	1	01
2008	November	13	13	0	0	0	0	0	0	03
2008	November	4	2	1	0	0	0	0	2	06
2008	November	1	0	0	1	0	0	0	0	07
2008	November	1	1	0	0	0	0	0	0	09
2008	November	1	1	0	0	0	0	0	0	12
2008	November	4	0	0	0	0	3	0	1	13
2008	November	3	0	0	3	0	0	0	0	14
2008	November	2	2	0	0	0	0	0	0	15
2008	November	2	2	0	0	0	0	0	0	16
2008	November	22	18	0	4	0	0	0	0	17
2008	November	2	1	0	0	0	0	0	1	18
2008	November	2	1	0	0	0	0	0	1	20
2008	November	4	1	0	0	0	1	0	2	none

Water Quality Technical Advisory Committee Meeting

119 E Olin Ave, Main Conference Room

12/15/08, 2:00 pm

Attending: Janet Battista (JB), Joe Demorett (JD), Gail Gawenda (GG), Madeline Gotkowitz (MG), Joe Grande (JG), Curtis Hedman (CH), Tom Heikkinen (TH), Jocelyn Hemming (JH), Amy Jones (AJ), Al Larson (AL), Sharon Long (SL), and Larry Nelson (LN). Absent: Ken Bradbury (KB)

- Agenda:
- A. Presentation: Assessment of Virus Presence and Potential Pathways in Deep Municipal Wells, 12/15/08 Update.
 - B. Subcommittee of Common Council
 - C. Composition of Technical Advisory Committee
 - D. Femrite Drive Well Site
 - E. Draft SOP for Water Quality Sampling of Test Wells
 - F. Sentinel Well Update
 - G. Royster Clark Remediation
 - H. Emerging Contaminants

To begin the meeting, all were introduced and they briefly described their occupations.

Agenda Item A: Presentation, Assessment of Virus Presence and Potential Pathways in Deep Municipal Wells, 12/15/08 Update – M. Gotkowitz, presenter

A handout containing the presentation slides was distributed. The take-home message of the presentation was that while deep aquifers traditionally have been assumed to be protected from contaminants, research shows that they should not be considered contaminant-free. Contaminants such as human viruses reach the aquifer in a relatively short amount of time, making disinfection of even deep groundwater very important. All wells tested positive for viruses at least once, although not all samples from each well were positive. Even Well 30, which is the newest well and cased through the Eau Claire shale, had evidence of viruses. A graph showed water levels of the lakes and aquifer relative to rainfall/snowmelt, and it was noted that virus levels in the wells spiked at the same time as water levels did. However, the lakes are not thought to be the virus source because the virus concentrations in lake water are too dilute to cause the virus concentrations found in the wells; it is more likely due to leaky sewers leak. Viruses are smaller than rock fractures and pores. Also, some wells are cross-connecting, meaning that there is no aquitard to prevent contamination of the aquifer. Another possible source may be old, unused, and improperly abandoned wells. These can force contaminated water directly down the boreholes into the aquifer. In 2008-2009 the plan is to continue to sample and to try to use species of viruses as tracers from sewer to well, with samples being taken while the pumps are running. MG also mentioned that they have submitted a proposal to the EPA to evaluate sewers as a source of pathogen contamination in wells as a future project. They would like to use ten sites in Madison as sample sites for that project.

Questions: SL asked if Mark Borchardt had given MG cell culture data to determine how infectious the viruses are. Joe G. stated that Mark does have the data, and that Wells 7 and 19 had live viruses capable of infecting cells. At least three of the samples taken were infectious. SL brought up new test methods that produce results faster than cell cultures. She will talk to Mark about them, because they could be used as a preliminary test to assist in deciding which samples would require a cell culture. JB asked about the correlation between rainfall and viruses. MG said that for viruses to move as fast as they have been shown to, there must be some kind of preferential flow. Fracture flow and improperly abandoned wells are two likely possibilities. A question was raised whether any of the unit wells are located near both a sewer and a private well. JG explained that private wells are often shallower and are not drilled through the Eau Claire. Someone asked if any other cities were tested in the same way as Madison for this project, but the other cities involved were only tested for whether viruses were found at the taps. JG talked about the upticks in virus levels in January following a thaw and in July after a major rainstorm, but that the Well 19 capture zone is Lake Mendota, and not near any sewers. In that way it does not fit the model of the other wells. LN pointed out that several of the unit wells are affected by lakes due to proximity and the likely absence of a continuous, confining layer. The utility has done pump tests that show lake water effects, expressed as

a greater amount of organic material than is found elsewhere in the system. He also described another example; a spring which appears a week after we turn off Well 14. TH asked about Well 30, but MG said that it is old water (preglacial) and shows no lake water influence. JG asked if more viruses are anticipated because of the unusual melting and rainfall the day before, and was told that there might be more if the ground isn't already frozen—sampling would be starting again today. He then asked why Well 7 showed evidence of a virus that is not found in sewage, labeled adenovirus-7 on Table 2 of the presentation. SL explained that it is an animal virus, not human, and may have come from birds. [*An excerpt from SL e-mail clarifying adenovirus 7: "typically is not a human enteric (digestive tract) pathogen. However, it can be a significant respiratory pathogen. Thus, the aerosol route of exposure is important. Usually, infections manifest themselves in children and immunodeficient individuals."*]. Whether a virus infects humans or animals can be determined by the proteins they contain which match up to unique types of proteins on the outsides of human or animal cells. This is one reason that viruses are viewed as tracers by microbiologists; they only infect specific species. JB asked if viruses have lifespans. Viruses are not alive but they have infectivity spans of up to two years. Groundwater is an ideal medium for them because it is dark and cold, with no UV light or warm temperatures to degrade them. TH asked if viruses need to be in a host cell or if they can exist without it. SL said that they can be released from the host as small particles but cannot replicate outside of a host. JG said that viruses have no innate motility but move where the water carries them. SL stated that they are also repelled by soil particles, which can make them move faster. JB asked if control samples were taken, and MG said they had been taken from the tap in the lab. JG posed a question to CH about emerging contaminants detectable at very low levels and whether tracers can be used to find transport mechanism for those. CH said they are using sterols as tracers, which was part of his presentation in Cincinnati.

Agenda Item B: Common Council Subcommittee on Committees

JG talked about a subcommittee formed to evaluate City of Madison boards, commissions, and committees. The subcommittee is attempting to standardize how City committees meet. They may subject the WQTAC to public meeting requirements such as issuing public notices prior to each meeting and allowing the public to attend, although they may still be exempt from other rules such as having to take minutes. He asked for feedback from the WQTAC members regarding this potential change.

JB suggested the possibility of citizen representatives to attend the meetings, but TH said that probably was not feasible if all members of the general public were not allowed to attend. SL asked if the press would also attend, and TH thought they might. JG has already recommended not opening the meetings to the public, as they are not meetings where public decisions are made but rather ones where utility staff is advised by technical experts. He will send a copy of the memo that was submitted to the subcommittee. TH remarked that public attendance could influence the nature of the discussions at WQTAC meetings; SL agreed that if meetings are closed to the public the WQTAC is free to discuss any scientific subjects that may otherwise not be understood by the general public. JH said she could see both sides—it is important for people to be educated, even though there is sometimes no clear answer resulting from the discussion. She asked if a member of the public asked to attend a meeting now, would they be allowed to? JG said if they asked they would probably not be excluded. However, people would need some scientific background to understand what is discussed. Several members described the uncertainty and contextual understanding that might be lacking by casual observers, and inappropriate conclusions that might be drawn following the discussion of complex topics. TH said there was the potential for the committee to spend considerable time educating the public rather than utility staff, which defeats the purpose. JG explained that there are some people who feel that closed WQTAC meetings allow decisions to be made in secret without oversight, but any recommendation made by the committee still needs approval of the Water Board.

Agenda Item C: Composition of Technical Advisory Committee

The committee currently consists of WU staff, two hydrogeologists, and a microbiologist and an aquatic toxicologist both from the WSLH. JG asked for suggestions of other representation of the committee. The following were suggested as possibilities: a human toxicologist, someone from the water supply program at WDNR, a UW chemist, someone from USGS, and maybe even an environmental consultant or chemical engineer. The committee considered Abigail Cantor as a possible addition; however, members expressed concern for a potential conflict of interest since she is currently under contract with the utility.

Agenda Item D: Femrite Drive Well Site

Previously, well construction and water quality data for a potential production well on Femrite Drive was discussed. It was announced that there is a public meeting on 12/17 to describe the potential project with the objective of improving fire flow capabilities and redundancy in southeast Madison. AL produced a map that shows fire flow deficiencies in red. The master plan recommends placing a well at the corner of Femrite Drive and Hwy 39, but there are several alternatives that will also be presented to the public. The Water Board will vote whether or not to establish the project, which would have a citizen advisory panel. Previously reviewed data from the WU's test well showed low levels of TCE and toluene at the site. JD had spoken with representatives from GE Healthcare (formerly Ohmeda – Ohio Medical), which is located near the site and is a known contaminant site. Previous manufacturing on that site, which stopped about a decade ago, was responsible for groundwater contamination. Trichloroethylene has been detected but no off-site migration had previously been identified. GE installed a monitoring well on the WU property about a month ago and recently sampled the well. Results show TCE levels around the MCL (5 ppb). GE has been cooperative with forwarding their lab results to the utility. GE is currently involved in a ground water investigation and remediation that is being overseen by WDNR. The question was raised about what to do considering this new information. JB recommended a full site investigation. JD said GE has been subject to investigation for ten years because their property is contaminated. It is not certain at this time whether GE is the source of the TCE. It was found at 180' and the Eau Claire is at 320'. It is not known whether the Eau Claire is intact or fractured in this area. Per JB the margins of the source area are required by law to be defined when the test result is higher than the MCL. GE plans to remediate their property. Other locations for test wells and location of private vs. public property were discussed. To ensure there are no contaminants in the wellhead protection zone, the DNR may require definition of the source, plume, and flow directions. If the source is on land owned by someone else, they would be required to clean it up. There will be further discussion in the future after more information is received from GE. The meeting on Wednesday is intended to discuss options to improve fire flow capacity and redundancy and not necessarily the viability of the potential well site. There are many ways the contamination may be cleaned up and it will depend on the contaminants found. SL discussed a technique using injected vegetable oil to create an anaerobic environment for certain organisms, which would then produce methane, encouraging the growth of other organisms that use methane. These bacteria in turn produce an enzyme that breaks down TCE into nontoxic ethylene and chloride. She estimated that a colony could be established within one or two months depending on the size of the TCE plume and how long it would last. It is unclear if any other potential sites for this well exist, as the property in question was purchased specifically for this purpose. The quarterly report produced by GE's consultant (GeoTran, Inc.) is available for review.

Agenda Item E: Draft SOP for Water Quality Sampling of Test Wells

A new procedure for water quality sampling of test wells was suggested at the last meeting. JG wrote up the procedure using MWU's standard template and asked the committee to review it for discussion at the next meeting.

Agenda Item F: Sentinel Well Update

JD updated the committee on progress on the Sentinel Well near Well 29. The city went out for bids on a well between the Sycamore Landfill and Well 29. It will likely cost \$47,000 for an 850' well. A multiport sampling system from Flute was also requested but city purchasing requires that it go out for bids as well even though Flute is the only company that manufactures such a thing. The quote received from Flute for the system is \$72,000. They would put a blank liner in the well first, and then KB would log the borehole before the liner is designed and installed. Montgomery Assoc. will be pump testing after KB samples but also before the final liner is installed. The goal is to have the sentinel well in place by February of 2009.

Agenda Item G: Royster Clark Remediation

Royster Clark, a former fertilizer plant, has been issued a demolition permit. Citizen groups are seeking to block development at the site. The current building protects the surrounding environment from infiltration by nitrates (fertilizer) and a leaky fuel tank, but if the building is demolished the contaminants may become exposed and possibly leach into the ground. The site is outside of the capture zones for all current wells and no new wells are planned for this area of the City. The question remains what the utility's interest in the site actually is. Opinions were expressed that the utility should not weigh in on the subject and in fact that it might be a waste of time and money to do anything since it is not near any current or potential well

sites. In addition, the Water Utility does not have the expertise or staff to get involved in re-development issues that do not directly impact drinking water source waters. JG acknowledged that the public feels the utility should have a greater voice in source water protection, but the DNR and DATCP have the ultimate jurisdiction over the site, and if it can be shown that the contaminants will not affect drinking water wells, then that should be the extent of the utility's involvement.

Agenda Item H: Emerging Contaminants

AwwaRF Report #91228 on pharmaceuticals and endocrine disruptors in drinking water is now available. JG handed out the title page and table of contents from Shane Snyder's report entitled "State of Knowledge of Endocrine Disruptors and Pharmaceuticals in Drinking Water". No one on the committee had seen the report yet. JG will send the executive summary around and also check into whether issuing copies of the report to the committee members infringes on the copyright. It may be possible to lend it out. JG will also make sure TH gets to see it. It contains, among other things, a chapter on communication with the public regarding decisions to test or not to test for emerging contaminants. This is an important issue because the compounds can be detected at increasingly lower levels, which may be harmless, but it could cause public concern. As TH put it, when a contaminant is found, the public may not understand the specifics—they just know it's there. The question is whether the utility should test for things found in such small amounts just because they can now be detected. JG mentioned that there is money set aside in the budget for the utility to do some testing if necessary. A soon-to-be-released companion report will suggest narrowing down the compounds to test for only the ones that are toxicologically significant, ones found in amounts that are toxicologically significant, or ones that could combine with other compounds to produce something harmful. Otherwise extensive testing can potentially waste valuable resources and contributes to additional solvents in the environment and greenhouse gas emissions. JG asked if anyone knew of any new research on the subject. CH said there is a new EPA testing method that was just released, and they will be using it to test tap water derived from Well 9. He said he would be surprised if he finds anything in it. Detection limits range from 0.5 to 5.0 ng/L, and vary by compound. JG asked what is most likely to be detected. CH said that if anything is found it would likely be ibuprofen, acetaminophen and caffeine. Sulfa drugs used to treat urinary tract infections and also for agricultural applications have been found in other areas. But it would be surprising to find these in our deep wells.

Meeting adjourned at 4:05 pm. The next meeting will be scheduled for sometime in March of 2009.