



KALAMAZOO COUNTY GOVERNMENT

In the Pursuit of Extraordinary Governance...

Sampling Fact Sheets

These fact sheets can be used by noncommunity water supplies to assist them in learning about:

- What test you may be sampling for,
- How to take samples,
- Interpreting sample results,
- Dealing with problems that may occur,
- Creating a contingency plan to use in case of emergencies.

In order to get the most benefit from these documents, it is recommended that the noncommunity water supplies use them in conjunction with the assistance from their local health department representative, especially dealing with problems.

Last Update on 10/24/2018

HEALTH AND COMMUNITY SERVICES DEPARTMENT
Environmental Health Unit

311 East Alcott Street | Kalamazoo, MI 49001
Phone: 269.373.5210 | www.kalcounty.com/eh

Fact Sheet: 1

Bacteriological (Coliform) Sampling Noncommunity Public Water Supplies

Water Supply Serial Number (WSSN) _____ Well # _____

Name of Water Supply _____

Sampling Contact _____ Phone _____

Health Department Contact _____ Phone _____

Coliform Sampling Frequency _____ (Annual, Quarterly, Monthly)

Coliform Sampling Location _____
(Sample siting plan required to be approved by local health department, see sanitary survey.)

Laboratory Name _____ Phone _____

Coliform Bacteria - General Information

Coliform bacteria are used as an indicator organism to assess the sanitary quality of drinking water. They are commonly found in high numbers in the intestinal tract of man and other warm-blooded animals and in sewage. They can also be found in surface waters, soils, and surfaces exposed to the elements. Coliform bacteria should not be found in a closed drinking water system that is functioning properly. Their presence can mean the integrity of the water system has been compromised. Repeat testing is required after an initial positive result.

Sampling Protocol

- Collect the samples just prior to delivery or mailing to the laboratory. Samples must be analyzed within 30 hours of collection.
- Use the proper sample container obtained from a certified laboratory.
- Read the sampling instructions carefully.
- Sample from an approved tap per the sample siting plan, not from hoses or locations that are unsanitary.
- Allow the water to run at full flow for several minutes before collecting the sample to flush stagnant water. (Fill out the sample form while you wait.)
- Adjust the tap to provide a pencil-sized stream of water. Remove the cap from the sterile bottle and take the sample immediately and replace the cap. *Note: The inside of the sample bottle may be treated with a powdered reagent, which must not be rinsed or blown out. Do not touch the inside of the bottle or cap.*
- Complete the report form *making sure the WSSN, well number, date and time of sampling* and return address are recorded on the form correctly. Be sure to request the proper lab analysis or test code for coliform bacteria and place the form with the container.
- Deliver or mail the sample to the lab as soon as possible so the 30 hours transit time is not exceeded. Sample must be iced or refrigerated while in transit to the laboratory.

After Receiving Coliform Test Results

Review the sample results and send a copy of results to the local health department. (If you use the DEQ lab and have properly completed the sample form, results are automatically sent to the local health department.)

- If sample results indicate coliform bacteria were not detected, i.e. Not Detected, ND, 0, or similar notation, continue on the designated routine sampling frequency.
- If sample results indicate coliform bacteria were detected, i.e. Positive, POS, Detected, FC POS, EC POS, or similar notation, you must:
 - Contact the local health department to discuss repeat sampling procedures.
 - Collect four (4) repeat samples within 24 hours of receiving the positive result (or by the next business day).
 - At least one sample must be from the same tap as the original positive sample.
 - At least one sample must be from the raw water tap (at or near pressure tank).
 - The rest should be from approved sampling locations within the distribution system listed on your sample siting plan. If there are not two other approved sampling taps in the system, collect at the original tap and the raw water tap again.
 - Three (3) routine samples are required the month following the repeat samples to confirm the problem was corrected.
 - If there is more than one coliform positive in any routine and/or repeat sampling or all 4 repeat samples are not collected, a Level 1 Assessment of the supply must be conducted within 30 days.
 - If the initial sample was *E. coli* positive, and one or more of the four repeat samples were total coliform positive or *E. coli* positive, an ***E. coli* MCL** has occurred.

If you have an MCL violation, you must:

1. Notify the local health department within 24 hours or the next business day.
2. Initiate an investigation to determine the cause and extent of the problem.
3. Notify the public (consumers) of the MCL violation as instructed by the local health department (LHD).
4. Provide a temporary alternate supply of water from an approved source, such as bottled water.
5. Take corrective measures, such as disinfection, repairs or construction upgrades, installation of a new well, etc., after the LHD conducts the Level 2 Assessment.
6. Once the corrective measures have been taken, additional sampling is required to resume normal service. Two consecutive samples must be negative for coliform bacteria and collected at least 24 hours apart. There must be no chlorine residual at the time of sampling, as confirmed by the use of a chlorine test kit.

You must have local health department approval prior to placing the well back into normal service and discontinuing public notice.

Revised Total Coliform Rule: A Quick Reference Guide

Overview of the Rule

Title*	Revised Total Coliform Rule (RTCR) 78 FR 10269, February 13, 2013, Vol. 78, No. 30
Purpose	Increase public health protection through the reduction of potential pathways of entry for fecal contamination into distribution systems.
General Description	The RTCR establishes a maximum contaminant level (MCL) for <i>E. coli</i> and uses <i>E. coli</i> and total coliforms to initiate a “find and fix” approach to address fecal contamination that could enter into the distribution system. It requires public water systems (PWSs) to perform assessments to identify sanitary defects and subsequently take action to correct them.
Utilities Covered	The RTCR applies to all PWSs.

* This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Public Health Benefits

Implementation of the RTCR will result in:

- ▶ A decrease in the pathways by which fecal contamination can enter the drinking water distribution system.
- ▶ Reduction in fecal contamination *should* reduce the potential risk from all waterborne pathogens including bacteria, viruses, parasitic protozoa, and their associated illnesses.

Critical Deadlines and Requirements

For Public Water Systems

Before April 1, 2016	<ul style="list-style-type: none"> ▶ PWSs must develop a written sample siting plan that identifies the system’s sample collection schedule and all sample sites, including sites for routine and repeat monitoring. ▶ PWSs monitoring quarterly or annually must also identify additional routine monitoring sites in their sample siting plans. ▶ Sample siting plans are subject to state review and revision.
Beginning April 1, 2016	PWSs must comply with the RTCR requirements unless the state selects an earlier implementation date.

For State Drinking Water Agencies

By February 13, 2015	<p>State submits final primacy program revision package to the EPA Region, including:</p> <ul style="list-style-type: none"> ▶ Adopted State Regulations. ▶ Regulation Crosswalk. ▶ 40 CFR 142.10 Primacy Update Checklist. ▶ 40 CFR 142.14 and 142.15 Reporting and Recordkeeping. ▶ 40 CFR 142.16 Special Primacy Requirements. ▶ Attorney General’s Enforceability Certification. <p>NOTE: EPA regulations allow states until February 13, 2015, for this submittal. An extension of up to 2 years may be requested by the state.</p>
Before February 13, 2015	<p>State must submit a primacy program revision extension request if it does not plan to submit the final primacy program revision package by February 13, 2015. The state extension request is submitted to the EPA Region including all of the information required in 40 CFR 142.12(b):</p> <ul style="list-style-type: none"> ▶ A schedule (not to exceed 2 years) for the submission of the final primacy program revision package. ▶ Justification that meets the federal requirements for an extension request. ▶ Confirmation that the state is implementing the RTCR within its scope of its current authorities and capabilities. ▶ An approved workload agreement with the EPA Region.
No later than February 13, 2017	For states with an approved extension, submit complete and final program revision package by the agreed upon extension date.

What are the Major Provisions?

Routine Sampling Requirements

- ▶ Total coliform samples must be collected by PWSs at sites which are representative of water quality throughout the distribution system according to a written sample siting plan subject to state review and revision.
- ▶ For PWSs collecting more than one sample per month, collect total coliform samples at regular intervals throughout the month, except that ground water systems serving 4,900 or fewer people may collect all required samples on a single day if the samples are taken from different sites.



Routine Sampling Requirements (cont.)

- ▶ Each total coliform-positive (TC+) routine sample must be tested for the presence of *E. coli*.
- ▶ If any TC+ sample is also *E. coli*-positive (EC+), then the EC+ sample result must be reported to the state by the end of the day that the PWS is notified.
- ▶ If any routine sample is TC+, repeat samples are required.
 - PWSs on quarterly or annual monitoring must take a minimum of three additional routine samples (known as additional routine monitoring) the month following a TC+ routine or repeat sample.
- ▶ Reduced monitoring may be available for PWSs using only ground water and serving 1,000 or fewer persons that meet certain additional PWS criteria.

Repeat Sampling Requirements

Within 24 hours of learning of a TC+ routine sample result, at least 3 repeat samples must be collected and analyzed for total coliform:	▶ One repeat sample must be collected from the same tap as the original sample.
	▶ One repeat sample must be collected from within five service connections upstream.
If one or more repeat sample is TC+:	▶ One repeat sample must be collected from within five service connections downstream.
	▶ The PWS may propose alternative repeat monitoring locations that are expected to better represent pathways of contamination into the distribution system.
If one or more repeat sample is TC+:	▶ The TC+ sample must be analyzed for the presence of <i>E. coli</i> .
	▶ If any repeat TC+ sample is also EC+, then the EC+ sample result must be reported to the state by the end of the day that the PWS is notified.
	▶ The PWS must collect another set of repeat samples, unless an assessment has been triggered and the PWS has notified the state.

Assessments and Corrective Action

The RTCR requires PWSs that have an indication of coliform contamination (e.g., as a result of TC+ samples, *E. coli* MCL violations, performance failure) to assess the problem and take corrective action. There are two levels of assessments (i.e., Level 1 and Level 2) based on the severity or frequency of the problem.

Purpose of Level 1 and Level 2 Assessments	<p>To find sanitary defects at the PWS including:</p> <ul style="list-style-type: none"> ▶ Sanitary defects that could provide a pathway of entry for microbial contamination, or ▶ Sanitary defects that indicate failure (existing or potential) of protective barriers against microbial contamination. <p><i>Guidance on how to conduct Level 1 and Level 2 Assessments and how to correct sanitary defects found during the Assessments can be found at:</i> http://water.epa.gov/lawsregs/rulesregs/sdwa/tcr/regulation_revisions.cfm.</p>
Deadline for Completing Corrective Actions	<p>When sanitary defects are identified during a Level 1 or Level 2 Assessment, they should be corrected as soon as possible to protect public health. The PWS must complete corrective actions by one of the following timeframes:</p> <ul style="list-style-type: none"> ▶ No later than the time the assessment form is submitted to the state, which must be within 30 days of triggering the assessment, or ▶ Within state-approved timeframe which was proposed in the assessment form.

Level 1 Assessments

Conducting Level 1 Assessments	▶ Performed by the PWS owner or operator each time a Level 1 Assessment is triggered.
	▶ Upon trigger of a Level 1 Assessment, the Level 1 Assessment form must be submitted within 30 days to the state.
Level 1 Assessment Triggers	<p>Level 1 Assessment is triggered if any one of the following occurs:</p> <ul style="list-style-type: none"> ▶ A PWS collecting fewer than 40 samples per month has 2 or more TC+ routine/ repeat samples in the same month. ▶ A PWS collecting at least 40 samples per month has greater than 5.0 percent of the routine/ repeat samples in the same month that are TC+. ▶ A PWS fails to take every required repeat sample after any single TC+ sample.

Level 2 Assessments

Conducting Level 2 Assessments	▶ Performed by the state or state-approved entity each time a Level 2 Assessment is triggered.
	▶ The PWS is responsible for ensuring that the Level 2 Assessment is conducted regardless of the entity conducting the Level 2 Assessment.
Level 2 Assessment Triggers	▶ Upon trigger of a Level 2 Assessment, the Level 2 Assessment form must be submitted within 30 days to the state.
	<p>Level 2 Assessment is triggered if any one of the following occurs:</p> <ul style="list-style-type: none"> ▶ A PWS incurs an <i>E. coli</i> MCL violation. ▶ A PWS has a second Level 1 Assessment within a rolling 12-month period. ▶ A PWS on state-approved annual monitoring has a Level 1 Assessment trigger in 2 consecutive years.



Seasonal System Provisions

The RTCR defines seasonal systems and specifies additional requirements for these types of PWSs:

- ▶ A seasonal system is defined as a non-community water system that is not operated as a PWS on a year-round basis and starts up and shuts down at the beginning and end of each operating season.

Start-up Procedures for Seasonal Systems	At the beginning of each operating period, before serving water to the public, seasonal water systems must: <ul style="list-style-type: none"> ▶ Conduct state-approved start-up procedures. ▶ Certify completion of state-approved start-up procedures. ▶ An exemption from conducting state-approved start-up procedures may be available for seasonal systems that maintain pressure throughout the distribution system during non-operating periods.
	Examples of state-approved start-up procedures, which need to be completed prior to serving water to the public, may include one or more of the following: <ul style="list-style-type: none"> ▶ Disinfection. ▶ Distribution system flushing. ▶ Sampling for total coliform and <i>E. coli</i>. ▶ Site visit by state. ▶ Verification that any current or historical sanitary defects have been corrected.
Routine Monitoring for Seasonal Systems	<ul style="list-style-type: none"> ▶ The baseline monitoring frequency for seasonal systems is monthly. ▶ A reduced monitoring frequency may be available for seasonal systems that use ground water only and serve fewer than 1,000 persons.

Other Provisions for the State Drinking Water Agency

Special Monitoring Evaluation	The state must perform a special monitoring evaluation at all ground water systems serving 1,000 or fewer persons during each sanitary survey to review the status of the PWS and to determine whether the sample sites and monitoring schedule need to be modified.
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Major Violations

<i>E. coli</i> MCL Violation	A PWS will receive an <i>E. coli</i> MCL violation when there is any combination of an EC+ sample result with a routine/repeat TC+ or EC+ sample result:	
	<i>E. coli</i> MCL Violation Occurs with the Following Sample Result Combination	
	Routine	Repeat
	EC+	TC+
	EC+	Any missing sample
	EC+	EC+
	TC+	EC+
	TC+	TC+ (but no <i>E. coli</i> analysis)
Treatment Technique Violation	A PWS will receive a Treatment Technique violation when any of the following occur: <ul style="list-style-type: none"> ▶ Failure to conduct a Level 1 or Level 2 Assessment within 30 days of a trigger. ▶ Failure to correct all sanitary defects from a Level 1 or Level 2 Assessment within 30 days of a trigger or in accordance with the state-approved timeframe. ▶ Failure of a seasonal system to complete state-approved start-up procedures prior to serving water to the public. 	

Key Points for Public Water Systems to Remember

Find and correct sanitary defects as soon as you become aware of them.

- ▶ This can help reduce *E. coli* MCL violations, which trigger a Level 2 Assessment.
- ▶ This can help reduce TC+ sample results, which may trigger a Level 1 Assessment.

Make sure to collect all routine and repeat samples as required.

- ▶ Timely and correct monitoring can help reduce triggering a Level 1 or Level 2 Assessment because:
 - Failure to conduct repeat monitoring triggers a Level 1 Assessment.
 - A Level 1 Assessment triggered twice within a certain timeframe triggers a Level 2 Assessment.

For additional information on the RTCR:

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA website at http://water.epa.gov/lawsregs/rulesregs/sdwa/tcr/regulation_revisions.cfm; or contact your state drinking water representative.

Fact Sheet: 2

Nitrate / Nitrite Sampling Noncommunity Public Water Supplies

Water Supply Serial Number (WSSN) _____ Well # _____

Name of Water Supply _____

Sampling Contact _____ Phone _____

Health Department Contact _____ Phone _____

Nitrate Sampling Frequency _____ (Annual, Quarterly, Monthly)

Nitrite Sampling Frequency _____ Once, unless initial result is greater than 0.5mg/l

Nitrate Sampling Location _____

(Sample siting plan required to be approved by local health department, see sanitary survey.)

Laboratory Name _____ Phone _____

Nitrates and Nitrites – General Information

Nitrate (NO₃) is a form of nitrogen combined with oxygen, which can be converted in the body to nitrite (NO₂). It can get into water if a well is improperly constructed or located where it is subject to contamination sources. Typical sources of nitrate include: sewage disposal systems, run-off from barnyards or fertilized fields, industrial wastes, etc., or may be found naturally occurring in the soil. Nitrates in large amounts may bond with hemoglobin in the red blood cells of infants and prevent it from carrying oxygen. This may cause a condition known as methemoglobinemia or “blue baby syndrome”. The acutely poisoned person will have a blue discoloration of the skin due to the reduction of the amount of oxygen in the blood stream and must be attended by a physician immediately. Also, because nitrates may be found in sewage or animal waste, excessive levels in drinking water may indicate the presence of other types of potentially harmful contaminants. The U.S. EPA has established a Maximum Contaminant Level (MCL) for nitrate at 10 milligrams per liter (mg/l) and 1.0 mg/l for nitrite.

Sampling Protocol

- Collect the samples just prior to delivery or mailing to the laboratory. Samples to be analyzed at the DEQ laboratory should be taken early in the week so they can be analyzed within 48 hours of collection.
- Use the proper sample container obtained from a certified laboratory. Do not rinse.
- Read the sampling instructions carefully.
- Allow the water to run at full flow for several minutes before collecting the sample to flush stagnant water. (Fill out the sample form while you wait.)
- Adjust the tap to provide a pencil-sized stream of water and fill the bottle to the neck.
- Complete the report form making sure the WSSN, well number, date and time of sampling and return address are recorded on the form correctly. Be sure to request the proper lab analysis or test code for automated partial chemistry if using the MDEQ lab or nitrate/nitrite if using a different lab.
- Deliver or mail the sample to the lab as soon as possible so the 48 hours transit time is not exceeded.

After Receiving Nitrate / Nitrite Sample Results

1. Review the sample results and send a copy of results to the local health department. (Note: if you use the MDEQ lab and have properly completed the sample form, results are automatically sent to the local health department.)
2. Normal monitoring requirements are once per year for nitrate and one time for nitrite (no further nitrite testing is required unless the result is greater than 0.5 mg/l).
3. Whenever an initial water sample exceeds the MCL level for nitrate (10.0 mg/l), nitrite (1.0 mg/l) or a combination of nitrate and nitrite (10.0 mg/l), you must:
 - a. Collect a confirmation sample within 24 hours of receiving the initial result.
 - b. If the average of two consecutive nitrate/nitrite samples exceeds 10.0 mg/l, the average of two nitrite samples exceeds 1.0 mg/l, or the cumulative average of both exceeds 10.0 mg/l, an MCL violation has occurred. (see below)
4. If the results are below the MCL levels for nitrate and nitrite, they are acceptable. However, if they exceed one half the standard (5.0 mg/l for nitrate or .5 mg/l for nitrite), an increase in sampling frequency is required based on your type II status:
 - a. A nontransient noncommunity public water supply with greater than mg/l nitrate or greater than 0.5 mg/l nitrite must sample QUARTERLY for at least 1 year.
 - If sampling during this or subsequent years indicate nitrate levels are consistently stabilized below the MCL, then the monitoring frequency may be reassigned to once per year.
 - b. A transient noncommunity public water supply with results from nitrite analysis indicating greater than 0.5 nitrite must sample QUARTERLY for at least one year as described above for nontransient supplies.

NOTE: Quarterly sampling for transient supplies with nitrate results that exceed 5.0 mg/l is not required unless indicated by the DEQ or its representative (local health department)

If you have an MCL violation, you must:

1. Notify the local health department within 24 hours or the next business day.
 2. Notify the public (consumers) of the MCL violation as instructed by the local health department.
 3. Provide a temporary alternate supply of water from an approved source, such as bottled water for those who request it.
 4. Find a new source. Often a new deeper well can be constructed to obtain water meeting the nitrate/nitrite standard.
 5. If municipal water is available, connection is required if an approved onsite source cannot be obtained
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Fact Sheet: 3

Volatile Organic Chemical (VOC) Sampling Noncommunity Public Water Supplies

Water Supply Serial Number (WSSN) _____ Well # _____

Name of Water Supply _____

Sampling Contact _____ Phone _____

Health Department Contact _____ Phone _____

VOC Sampling Frequency: Number of Samples _____ taken every _____ months.

Sampling Location _____

(Sampling siting plan approved by local health department in sanitary survey)

Laboratory Name _____ Phone _____

Volatile Organic Chemicals – General Information

Volatile organic chemicals include components of petroleum based products and industrial solvents and chemicals. They may be associated with leaking underground tanks, improper disposal practices, leachate from landfills and other activities. Ingestion of these chemicals at certain levels in drinking water may lead to anemia, liver and spleen disorders, reproductive problems and an increased risk of certain cancers. Their presence in drinking water may be linked to possible contamination by these sources and may indicate a poorly constructed or damaged well, a vulnerable aquifer, a contaminated site or a combination of any of these. The US EPA has established Maximum Contaminant Levels (MCLs) for some of these chemicals and others are required to be tested for but no MCL has been established.

Sampling Protocol

- Obtain the proper sample containers from a laboratory certified by the DEQ for analysis of all required parameters.
- The sample vials may contain a chlorine neutralizer. Tap each vial in an upright position to drain the preservatives from the cap. Do not rinse the bottle before collection. Do not open the vial until ready to collect the sample. Do not touch the inside of cap or vial.
- Select a clean faucet without attachments or leaking stem. Allow water to run for ten minutes (until cold) at full flow.
- Reduce the flow and collect the sample directly into all vials provided. Fill the vial until water rounds at the top of the vial. Cap and invert to check for air bubbles in the vial. (The septa, i.e. the rubber part inside the cap ring, must be smooth side down in contact with the sample to avoid possible contamination.)
- If air is observed in the inverted sample, remove the cap, add water (don't dump) and recap as instructed.
- Keep the samples refrigerated and complete the report form making sure to record the WSSN, well number, date and time of sampling and return address on the form correctly. Be sure to request the proper lab analysis or test code for volatile organic chemistry if using the DEQ lab. Use the appropriate forms if using a different certified lab.
- Deliver or mail the sample units together to the lab as soon as possible so the transit time is not exceeded. See the unit label for transit times.

Volatile Organic Chemical Sampling (with waiver)

Contaminant	MCL (mg/l)	Contaminant	MCL (mg/L)
Benzene	0.005	Vinyl Chloride	0.002
Carbon tetrachloride	0.005	1,2-dichloroethane	0.005
Trichloroethylene	0.005	1,2-dichloroethylene	0.007
1,1,1-trichloroethane	0.20	Para-dichlorobenzene	0.075
Cis-1,2-dichloroethylene	0.07	Ethylbenzene	0.7
O-dichlorobenzene	0.6	Styrene	0.1
Tetrachloroethylene	0.005	Toluene	1.0
Trans-1,2-dichloroethylene	0.1	Xylenes (total)	10.0
Dichloromethane	0.005	1,2,4-trichlorobenzene	0.07
1,1,2-trichloroethane	0.005	1,3-dichloropropane	0.005
Chloroform	Monitor only	Chlorobenzene	0.1
Bromodichloromethane	Monitor only	1,1-dichloroethylene	Monitor only
Bromoform	Monitor only	M-dichlorobenzene	Monitor only
1,1-dichloropropene	Monitor only	1,1-dichloroethane	Monitor only
1,1,2,2-tetrachloroethane	Monitor only	Chloromethane	Monitor only
Bromomethane	Monitor only	1,2,3-trichloropropane	Monitor only
1,1,1,2-tetrachloroethane	Monitor only	Chloroethane	Monitor only
2,2-dichloropropane	Monitor only	O-chlorotoluene	Monitor only
P-chlorotoluene	Monitor only	Bromobenzene	Monitor only
1,3-dichloropropane	Monitor only		

After Receiving VOC Test Results

1. Review the sample results and send a copy of results to the local health department. (Note if you use the DEQ lab and have properly completed the sample form, results are sent to the local health department.)
2. If the sample shows “non-detect” for all analytes:
 - No further action is necessary unless conditions change or you are notified otherwise by the local health department.
 - Sample on the frequency established by your health department (usually 1 sample every 6 years with a written waiver.)
3. If the sample indicates the presence of one or more of the analytes:
 - Immediately contact your health department for instructions regarding further sampling requirements.
 - Compliance with MCLs is determined by averaging results for four quarters or if one confirmed result is four times higher than the standard.

Fact Sheet: 4

Synthetic Organic Chemical (SOC) Sampling Nontransient Noncommunity Public Water Supplies

Water Supply Serial Number (WSSN) _____ Well # _____

Name of Water Supply _____

Sampling Contact _____ Phone _____

Health Department Contact _____ Phone _____

SOC Sampling Frequency: Number of Samples _____ taken every _____ months.

Sampling Location _____

(Sampling siting plan approved by local health department in sanitary survey)

Laboratory Name _____ Phone _____

Synthetic Organic Chemicals – General Information

Synthetic organic chemicals are commonly found in pesticides and other industrial and commercial chemical discharges, such as emissions from incinerators. It reaches groundwater through runoff and leachate from industrial and agricultural activities, as well as from landfills. Many of these chemicals may cause health effects such as liver and kidney problems, central nervous system and reproductive difficulties and may even increase the risk of certain kinds of cancers. Their presence in drinking water may indicate a damaged or poorly constructed well, an aquifer under the influence of surface water, a contaminated site or a combination of any of these. The US EPA has established Maximum Contaminant Levels (MCL) for these chemicals in public water supplies.

Sampling Protocol

- Obtain proper sample containers from a lab certified by the DEQ for analysis of all required parameters.
- The DEQ lab provides three different sample bottles per SOC sample. All three must be filled according to the directions with the bottles. Follow the sampling protocols included with the bottles if using a different certified lab.
- These bottles contain preservatives. Tap the bottle in an upright position to drain preservatives from cap. Do not rinse the bottle before collection. Do not open the bottle until ready to sample. Do not touch the inside of the cap or bottle.
- Select a clean faucet without attachments or leaking stem. Allow the water to run for about ten minutes (until cold) at full flow from the sampling tap.
- Reduce the flow to avoid splashing and collect the sample directly into the bottle. Fill to the bottom of the neck. Cap and invert 5 times to mix the sample with the preservatives.
- Keep the sample refrigerated and complete the report form making sure the WSSN, well number, date and time of sampling and return address are recorded correctly. Be sure to request the proper lab analysis or test code for synthetic organic chemicals and place the form with the bottles.
- Deliver or mail the samples to the lab as soon as possible to the transit time is not exceeded. See the unit label for transit times.

Synthetic Organic Chemical Sampling (with waiver)

Contaminant	MCL (mg/l)	Contaminant	MCL (mg/l)
Alachlor	0.002	Aldicarb	0.003
Aldicarb sulfoxide	0.004	Aldicarb sulfone	0.002
Atrazine	0.003	Benzo(a)pyrene	0.0002
Carbofuran	0.04	Chlordane	0.002
Dalapon	0.2	Di(2-ethylhexyl)adipate	0.4
Di(2 ethylhexyl)phthalate	0.006	Dinoseb	0.007
Heptachlor	0.0004	Heptachlor epoxide	0.0002
Hexachlorobenzene	0.001	Hexachlorocyclopentadiene	0.05
Lindane	0.0002	Methoxychlor	0.04
Oxamyl (vydate)	0.2	Pentachlorophenol	0.001
Picloram	0.5	Polychlorinated biphenyls	0.0005
Simazine	0.004	Toxaphene	0.003
2,4-D	0.07	2,4,5-TP silvex	0.05
Aldrin	Monitor only	Butachlor	Monitor only
Carbaryl	Monitor only	Dicamba	Monitor only
Dieldrin	Monitor only	3-hydroxycarbofuran	Monitor only
Methomyl	Monitor only	Metribuzin	Monitor only
Propachlor	Monitor only		

After Receiving VOC Test Results

1. Review the sample results and send a copy of results to the local health department. (Note if you use the DEQ lab and have properly completed the sample form, results are sent to the local health department.)
2. If the samples are “non-detect” for all analytes:
 - No further action is necessary unless conditions change or you are notified otherwise by the local health department.
 - Sample on the frequency established by the local health department (usually 1 sample every 6 years with a written waiver).
3. If the sample indicates the presence of one or more of the analytes:
 - Immediately contact your health department for instructions regarding further sampling requirements.
 - Compliance with an SOC MCL is determined by averaging results for four quarters. It is exceeded if one confirmed sample is four times higher than the standard.

Fact Sheet: 5

Metals and Cyanide (Inorganic Chemicals) Sampling Noncommunity Public Water Supplies

Water Supply Serial Number (WSSN) _____ Well # _____

Name of Water Supply _____

Sampling Contact _____ Phone _____

Health Department Contact _____ Phone _____

Complete Metals Sampling Frequency: Number of Samples _____ taken every _____ years.

Cyanide Sampling Frequency: Number of Samples _____ taken every _____ years.

Sampling Location _____

(Sampling siting plan approved by local health department in sanitary survey)

Laboratory Name _____ Phone _____

Metals and Cyanide – General Information

The regulated metals are generally toxic in varying degrees and their presence in drinking water may be the result of contamination by industrial waste or some may be naturally occurring in certain soils and geologic formations in Michigan. Their presence at significant levels may be an indication of poor well construction or a vulnerable aquifer. Cyanide is used to make the compounds needed to make nylon and other synthetic fibers and resins, as well as being found in some herbicides. It does not bind with soil and may migrate to groundwater.

Sampling Protocol

- Obtain the proper bottles from a certified laboratory and follow the instructions provided.
- Collect the samples just prior to delivery or mailing to the laboratory. Samples must be analyzed within 14 days of collection. Keep the sample refrigerated.
- Collect sample as close to the well as possible prior to any treatment and flush stagnant water by running water at full flow for several minutes before collecting the sample. (Fill out the form while you wait.)
- Adjust the tap to provide a pencil sized stream of water and fill the bottle to the bottom of the neck.
- Complete the report form making sure to record the WSSN, date and time of sampling and return address are recorded on the form correctly. Be sure to request the proper tests.
- Deliver or mail the samples to the lab as soon as possible.

Note: In order to comply with the state regulation, it is necessary to use a laboratory certified in the analysis of all of the required chemical analytes.

Sampling for complete metals and cyanide is required for nontransient noncommunity supplies only.

Inorganic Sampling (with waiver)

Contaminant	MCL (mg/l)	Contaminant	MCL (mg/l)
Antimony	0.006	Mercury	0.002
Barium	2.0	Nickel	0.1
Beryllium	0.004	Cadmium	0.005
Chromium	0.1	Selenium	0.05
Cyanide	0.2	Thallium	0.002

After Receiving Test Results

1. Review the sample results and send a copy of results to the local health department. (Note: if you use the DEQ lab and have properly completed the sample form, results are automatically sent to the local health department.)
2. One sample is required per three year monitoring period. If there have been three testing cycles (9 years) not exceeding the maximum contaminant level (MCL), the frequency may be decreased to one sample every nine years.
3. Whenever an initial water sample exceeds the MCL for any of the analytes:
 - A confirmatory sample must be taken from the same tap within 24 hours of receipt of the test results.
 - There is a violation of the drinking water standard if the average of the two samples exceeds the MCL.

If you have an MCL violation, you must:

1. Notify the local health department within 24 hours or the next business day.
2. Notify the public (consumers) of the MCL violation as instructed by the local health department.
3. Provide a temporary alternate supply of water from an approved source, such as bottled water.
4. Find a new source. Often a new deeper well can be constructed to obtain water meeting the standard.
5. If municipal water is available, connection is required if an approved onsite source cannot be obtained



ARSENIC IN WELL WATER

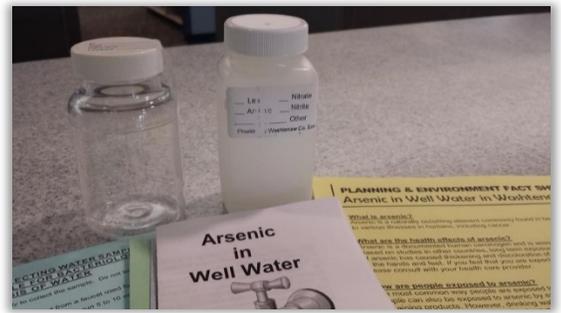
Guidance

Introduction

The Michigan Department of Environmental Quality (DEQ) recommends that homeowners have their well water tested for arsenic. Arsenic is a chemical element that naturally occurs in the earth's mineral deposits and dissolves in groundwater. Michigan has naturally higher arsenic levels in groundwater. Arsenic in drinking water may have harmful health effects depending on how much you consume and how sensitive you are to it. Since arsenic cannot be seen or tasted in water, a laboratory analysis specifically designed for detecting arsenic is the only way to determine the arsenic level in drinking water wells.

How do I have my well water tested for arsenic?

To test for arsenic, call the DEQ's Drinking Water Laboratory at 517-335-8184, or any commercial laboratory certified to test for arsenic. Your local health department can provide you with a list of certified laboratories or make arrangements for your water to be tested by the DEQ Laboratory. Contact the laboratory to obtain water sample collection bottles and instructions for sample collection. You can find the address and telephone number for your local health department in the government section of your local phone book or at www.malph.org.



Arsenic Exposure

A few areas in Michigan have naturally higher arsenic levels in groundwater. Exposure to inorganic arsenic typically occurs through groundwater used for drinking and cooking. Although, exposure is possible in the following ways:

- A large source of total arsenic comes from the food we eat. However, most of the arsenic in food is in an organic (carbon containing) form which is much less harmful than the inorganic arsenic found primarily in groundwater. Some foods also contain inorganic arsenic but the main exposure to inorganic arsenic is normally from consuming water.
- Arsenic may be inhaled by breathing in dust from industrial processes or smoke from burning arsenic-treated wood. Tobacco smoke also contains small amounts of arsenic.
- Work-related exposures to arsenic may occur in certain occupations.
- Arsenic is not readily absorbed by the skin; contact with water (showering, laundering, washing dishes, etc.) is not a risk.

Health Risk Factors

If you have been exposed to arsenic, several factors will determine your health risk. These factors are:

- Dose – The amount of arsenic in your body
- Duration – How long and how often your body has been exposed to arsenic
- Type of arsenic – Whether your body has been exposed to inorganic or organic arsenic
- General health, age, lifestyle, and diet – Some people may be affected by lower levels of arsenic while others remain unaffected at the same levels. Young children, the elderly, people with long-term illnesses, and unborn babies are at greater risk, as they can be more sensitive to exposure.

Human Health Effects of Arsenic Exposure

The way arsenic affects our bodies is not fully understood. Long-term exposure to low levels of inorganic arsenic in drinking water is known to cause human health problems including: cancer, thickening and discoloration of the skin, problems with blood vessels, high blood pressure, heart disease, nerve effects including numbness and/or pain, and interference with some important cell functions.

Short-term exposure to very high levels of arsenic may cause stomach pain, nausea, vomiting, diarrhea, headaches, weakness, and even death; but, groundwater in Michigan has not been shown to have this high a level of arsenic. There is some evidence that suggests that long-term exposure to low levels (≥ 0.005 milligrams/liter (mg/L)) of arsenic from drinking water may result in lower IQ scores in children.

If you have concerns about health problems that may be related to arsenic in your well water, discuss them with your doctor. A urine test will indicate if you have been exposed to arsenic at levels of concern.

Interpreting Water Sample Results

The U.S. Environmental Protection Agency (U.S. EPA) set an arsenic maximum contaminant level (MCL) for public water supplies at 0.010 mg/L. This is equivalent to 0.010 parts per million (ppm), 10 micrograms/liter ($\mu\text{g/L}$), or 10 parts per billion (ppb). The EPA also sets the MCL Goal (MCLG) for drinking water. The MCLG is set at a level that uses the best available science to prevent potential health problems. The EPA has set the MCLG for arsenic at zero.

For private water supplies (i.e. individual residential wells) the arsenic drinking water health advisory recommendation is also 0.010 mg/L. *If the arsenic in your water exceeds 0.010 mg/L, the DEQ recommends that you do not use your well water for drinking or cooking.*

What to do if you have Arsenic in your Drinking Water

Contact your local health department to discuss solutions that have worked in your area. There are several options available to reduce exposure to arsenic in drinking water, including:

- Connecting the home to a public (municipal) water supply (if available). Public water supplies are required to meet the arsenic MCL.
- Replacing a well or modifying a well to draw water from an aquifer with lower levels of arsenic may be possible. Contact your local health department **before** replacing or modifying your water well to discuss whether this is a viable option.
- Using bottled water for drinking and cooking. Commercially prepared bottled water for sale meets the arsenic MCL.
- Treating drinking water with point-of-use reverse osmosis (RO) or arsenic adsorption media cartridge filters is the most effective and practical treatment method for residential use. Point-of-entry treatment which treats all water entering the home is also an option. Before installing a water treatment system, owners should carefully research the treatment system's effectiveness for arsenic reduction and its operational and maintenance requirements. Generally, arsenic adsorption media point-of-entry treatment is used with water low in iron, while oxidation/filtration (greensand iron removal) is used with water high in iron. Water softeners and activated carbon filters do not reduce arsenic levels effectively. A treatment unit certified by NSF International for arsenic reduction and installed to their specifications is recommended. Information is available at www.nsf.org.

Additional Resources

[U.S.EPA Chemical Contaminant Rules: Arsenic](#)

[Center for Disease Control and Prevention - Arsenic and Drinking Water from Private Wells](#)

[Agency for Toxic Substances and Disease Registry – Toxic Substances Portal Arsenic](#)

[World Health Organization Arsenic Fact Sheet](#)

[Statewide Arsenic Map](#)

This publication is intended for guidance only and may be impacted by changes in legislation, rules, policies, and procedures adopted after the date of publication. Although this publication makes every effort to teach users how to meet applicable compliance obligations, use of this publication does not constitute the rendering of legal advice.



FACT SHEET

DRINKING WATER AND MUNICIPAL ASSISTANCE DIVISION – ENVIRONMENTAL ASSISTANCE CENTER 800-662-9278

LEAD AND COPPER SAMPLING REQUIREMENTS FOR NONCOMMUNITY WATER SUPPLIES

In 1974, out of concern for the quality of the water we drink, Congress passed the Safe Drinking Water Act (SDWA). The SDWA gave the U.S. Environmental Protection Agency (EPA) responsibility for establishing and enforcing drinking water quality standards nationwide. The Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399), was enacted in 1976 and enables the Michigan Department of Environmental Quality (DEQ) to maintain primacy (state authority) over the drinking water program in our state. Act 399 regulates both community and noncommunity water supplies (NCWSs).

NCWSs are classified as two different types:

- A transient NCWS is one that serves water to 25 or more *different* people each day for at least 60 days out of the year. Examples include restaurants, convenience stores, campgrounds, etc.
- A nontransient NCWS serves the *same* 25 people each day for six months of the year, such as a school, factory, office building, etc.

The SDWA contains language regarding the requirements for nontransient NCWSs built prior to 1987 to test for lead and copper. The Federal lead and copper regulations were revised in 1998. These revisions went into effect on April 11, 2000, requiring ALL NCWS to test for lead and copper. The rule changes have been implemented in Michigan as part of the primacy agreement.

Your sampling frequency and number of samples due will be determined by your local health department.

Why be concerned about lead or copper?

Lead is a common metal found throughout the environment in lead-based paint, air, soil, household dust, food, and water. *It builds up in the body over many years and may result in damage to the brain, red blood cells, and kidneys.* Lead enters drinking water primarily as a result of corrosion or wearing away of materials containing lead in the water distribution system, such as lead service lines and lead solder. The presence of copper in drinking water is also primarily a result of corrosion. Acute exposure to copper can result in nausea and diarrhea.

It has been shown that some fixtures, even though they were labeled "lead-free," have released small amounts of lead when exposed to water with corrosive or acidic qualities. Copper is still commonly used in plumbing fixtures and piping, and these water quality factors may cause copper to be released into the drinking water.

I only have two drinking water fountains in my building; do I still have to take the required number of samples?

If you have fewer drinking water fixtures than the chart requires, your monitoring requirements maybe adjusted. For more information on adjusting your lead/copper sampling obligations, contact your local health department.

We operate a large facility with multiple buildings and numerous drinking water fixtures. How many and where to do we sample from?

Sample the drinking water fixtures in the building up to the chart number based on the population of your facility. For instance, if your building has eight drinking water fixtures and you are required to take five samples, sample only five of the fixtures. If you have more than the chart number of drinking water fixtures, select fixtures that represent the water distribution system (i.e., one in each building wing or on each floor). A sample siting plan should be discussed during your sanitary survey.

For large facilities, collect at least one sample per building until you get the number of samples required. Or, you can collect more than the minimum number of samples. If you have only a few buildings, split the samples among them as to best represent where the water is being consumed.

Sampling protocol

- ✓ Obtain sample containers and analysis from a laboratory certified by the DEQ for lead/copper analysis.
- ✓ Collect first draw samples (water has stood motionless in the piping for at least 6 hours). Do not sample after weekends, holidays, or extended periods of stagnation. Do not flush the sample tap before sample collection.
- ✓ Collect samples where water is drawn primarily for drinking. Sample drinking fountains or kitchen/breakroom faucets if they are used routinely to obtain water for consumption. Do not sample from mop sinks, hose bibs, etc.
- ✓ Submit the samples to the laboratory for analysis and record the results on the sample record log provided by the DEQ.
- ✓ Calculate the 90th percentile using the directions on the log sheet, or submit your sample results to the local health department's noncommunity staff person for calculating the 90th percentile.
- ✓ Whether or not you do the calculations of the 90th percentile yourself, you are required to submit the results to the local health department noncommunity staff person.

Action levels of 0.015 milligrams per liter (mg/l) for lead and 1.3 mg/l for copper were established in 1991. If the 90th percentile result exceeds either level, the water supply is required to initiate an investigation by:

- Contacting the local health department for further instructions
- Sampling all other drinking water taps not previously sampled
- Sampling the source water
- Providing public education on the lead exceedance to the population exposed. A copper exceedance does not require public notice at this time.

Corrective measures for action level exceedances may include replacement of fixtures, piping, or service lines. If the contaminant level still cannot be reduced below the action level through implementation of these measures, the water supply will need to conduct a treatment study to investigate whether the installation of corrosion control technology may be necessary.

Lead Consumer Notification

All nontransient NCWSs are required to provide all lead testing results for drinking water to consumers, pursuant to Rule 410(5) of the SDWA. The Lead Consumer Notice (LCN) shall be issued within 30 days of the owner/operator learning the results, even if no lead is detected. The LCN does not meet the requirement to provide Public Education in the event of a lead exceedance.

If you have questions regarding this regulation or other sampling requirements you may have, contact your local health department's noncommunity coordinator.

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For information or assistance on this publication, please contact the Drinking Water and Municipal Assistance Division through the DEQ Environmental Assistance Center at 800-662-9278. This publication is available in alternative formats upon request.