DRINKING WATER
Background Materials

CEHRC's Drinking Water Background Materials give an introduction to the hazards that may be found in residential drinking water. These materials are intended to assist community-based organizations conducting indoor environmental sampling campaigns in understanding the issues around drinking water quality and accompany CEHRC training in drinking water assessment. The Background Materials may also be of interest to those in the general public concerned about indoor environmental health issues.

When is Drinking Water Unsafe?

Every home needs safe drinking water whether the water comes from a well in the yard or from a local public water supplier. A variety of contaminants can get into drinking water from several sources, making it unsafe to drink.

Sources:

Natural Sources: Contaminants such as calcium carbonate, arsenic, and petroleum can get into the drinking water from the ground itself.

Source Water Contamination: The water supply in a reservoir, stream or the ground can be contaminated by human activity or widespread pollution. Petroleum, bacteria, parasites, viruses, pesticides, fertilizers, and industrial chemicals are common contaminants.

Water Treatment: Disinfectants like chlorine are used to kill microorganisms such as bacteria, parasites or viruses in water. These disinfectants can pose health problems either directly or through their byproducts.

Piping: Lead and copper can get into the water from pipes when water sits in the pipes or is heated. In this process, called leaching, the water pulls the metal from the piping. The lead leaches from the lead pipe or from lead solder in copper pipes. Copper also leaches from copper piping. "Hard water" (water that is high in dissolved calcium carbonate) slows this leaching. Hard water forms a "lime" coating on appliances. This lime coating in the pipes serves as a barrier between lead and copper and the drinking water. Some plastic pipes and tank liners can leach hazardous organic contaminants.

Categories of Drinking Water Contaminants

Microorganisms: Seven types of standards deal with pathogens (things that causes diseases) such as viruses, parasites and bacteria. The most common measure is "total coliform" which measures the sewage from humans or animals that may be contaminating the water. The other measure is "turbidity" (cloudiness). High turbidity indicates that pathogens may be present.

Disinfectants and Their Byproducts: Disinfectants kill pathogens such as bacteria. In the process of disinfecting the water, they generate contaminants that can cause health problems. While you want to reduce exposure to all contaminants, it is better to kill the microorganisms and deal with the disinfection byproducts. EPA has established three standards for disinfectants and four standards for their byproducts. The most common disinfectant is chlorine. Chlorine is the active ingredient in bleach.

Inorganic Chemicals: Inorganic chemicals consist of metals such as lead, mercury, copper, and arsenic or other chemicals that do not have carbon and hydrogen in them such as asbestos, cyanide, or nitrates. EPA has set standards for 16 inorganic chemicals. Some of these chemicals are naturally occurring. Most are from humans.

Organic Chemicals: Organic chemicals have carbon and hydrogen in them. EPA has set standards for 27 chemicals. Most of them are man-made pesticides, industrial chemicals, or from petroleum products.

Radionuclides: Several atoms such as uranium and radium release radiation that gets into the water and can increase the risk of cancer. EPA has set standards for two types of radiation called radionuclides and two common metals – uranium and radium – that release radiation. The test kit used by CEHRC does not check for these contaminants.

Nuisance Chemicals: EPA has set standards to protect water from cosmetic effects such as skin or tooth discoloration or aesthetic effects such as taste, color, or odor). These standards are only recommendations and do not have to be met.

Reasons to Test Drinking Water

If a public water supplier does not provide the drinking water, it is probably not being monitored. If it is from a small public water supplier, it may not be regularly monitored. The drinking water may

be contaminated with sewage, fertilizer, pesticides or lead and you may not know it. The problem is especially significant for a home with a private well and an old septic system that may be failing. Although the grass may be greener over the septic tank, it may be putting pathogen and nitrates into the drinking water. Also, if pesticides or fertilizer are applied near the well, or if the well is located next to a farm, there may be problems with pesticides or nitrates in the drinking water.

Supplies

CEHRC uses the following supplies and equipment to test drinking water for harmful contaminants:

- WaterSafe® Drinking Water Test kit.
- CEHRC Drinking Water Report

These materials do not constitute endorsement of a particular product.

Testing Drinking Water for Hazards

There are many water test kits on the market. Some check for one or two contaminants. Several include lab analysis in the initial cost. Lab analysis can range from $10 to more than $50. CEHRC uses the WaterSafe® Drinking Water Test because it is easy to use, inexpensive, gives fast results, and can check a wide variety of common pollutants. Individual kits cost $13.95; quantity discounts (an order of 50 kits cost $6.95 per kit). The WaterSafe® kit tests for:

Lead

Lead usually comes from the lead in piping or in the solder on copper piping. It can also come from natural and man-made contamination of a water supply. While lead can hurt everyone, infants and children are especially sensitive. It causes delays in physical and mental development and deficits in attention span and learning abilities.

Bacteria as total coliforms

Coliforms are naturally present in the environment as well as in feces. Fecal coliform and e. *coli* only come from human and animal waste. Coliforms are not a health threat in itself. A positive result on the test kit indicates that sewage may be getting into a water supply or the distribution system.

Atrazine & Simazine, combined

Atrazine is the most heavily used herbicide in the United States. It controls broadleaf weeds and some grassy weeds. It is most commonly used on corn crops, primarily in the Midwest, but it also used on sorghum and sugar cane crops, as well as golf courses and residential lawns in Florida and the Southeast. Atrazine is also used on Christmas tree farms. People exposed to high levels of atrazine for relatively short periods of time can experience congestion of heart, lungs, and kidneys; low blood pressure; muscle spasms; weight loss; and damage to adrenal glands. Long-term exposure can result in weight loss, cardiovascular damage, retinal and some muscle damage. Atrazine has also

been associated with imbalances in hormone levels in lab animals that could possibly disrupt reproductive and developmental processes. 200 community water systems, primarily in the Midwest, have approached or exceeded the 3 ppb MCL for atrazine primarily in the Spring when rains carry it from the fields. Atrazine has been detected numerous times in ground water in Delaware, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska and New York.

Simazine is used to stop broadleaf and certain grassy weeds from growing. 4800 million pounds are used each year on artichoke, asparagus, berry, bean, and citrus crops. Short-term exposure to high levels of simazine may cause weight loss and changes in blood. Long-term exposure may result in tremors; damage to testes, kidneys, liver, and thyroid; gene mutations; and cancer.

Nitrites & Total Nitrates

Both nitrites and nitrates come from the runoff of fertilizer from farms and lawns or failing septic tanks and sewage system overflows. Infants below the age of six months who drink water containing more than 10 ppm of total nitrates or 1 ppm of nitrites could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome. Adults can also be affected although less severely.

Total Chlorine

Chlorine kills coliforms. However, high levels of chlorine may cause eye/nose irritation and stomach discomfort.

pH

pH is a measure of how acidic or alkaline the water is. The pH should be between 6.5 and 8.5 for drinking water. If it is less than 6.5, it is too acidic. If it is more than 8.5 it is too alkaline or basic. If it is acidic or alkaline, the water should be checked. Beyond the nuisance problem, it may be an indicator of another chemical getting into the drinking water; there are thousands of chemicals that could cause a pH problem, and/or it could be natural. If the pH is acidic or alkaline, talk to the local water supplier and EPA, or state drinking water regulator.

Total Hardness (measured as total dissolved calcium carbonate)

Calcium carbonate levels over 500 ppm affect the taste of water and form the white crust in toilets, showers and on faucets where hard water is used. Water softeners are used to remove the calcium. Water with low levels of calcium carbonate – also known as soft water – is more likely to leach lead and copper from piping. Typically, rainwater is "soft" and ground water is "hard."

The kit should only be used as a screening tool. Positive results should be investigated. Additional testing usually involving more expensive lab analysis will probably be needed. Your local health department can provide more guidance.

What Standards Apply?

The U.S. Environmental Protection Agency (EPA) has established standards for contaminants in drinking water likely to cause adverse human health effects. These standards are called Maximum Contaminant Levels (MCL) and Maximum Contaminant Level Goals (MCLG). These standards only apply to public water suppliers. They do not apply to systems too small to qualify as public water systems or to people who use the water such as homeowners or landlords. Only the supplier is impacted.

MCLGs are set at a level below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals. The MCLG for known carcinogens is zero.

MCLs are set as close to the MCLG as feasible considering the best available treatment technology and cost. The MCL and MCLG are the same for the contaminants measured by the WaterSafe® kits except for lead.

The MCLG for lead is zero. The MCL establishes an Action Level of 15 parts per billion (ppb) for lead and requires a Treatment Technique for levels above the action level. If more than 10% of tap water samples exceed the action level of 15 parts per billion (ppb), public water suppliers must control corrosion, control contamination in the source water and educate the public. If lead service lines contribute to the problem, they must replace 7% of its lines each year. "Soft water" (water that is low in total dissolved solids of calcium carbonate, a naturally occurring contaminant in the ground) is more likely to leach lead from piping.

EPA also sets Secondary Drinking Water Standards for contaminants that are nuisance chemicals such as pH and hardness. These standards are not enforceable.

Contaminant	EPA Standard
Lead	Below 15 ppb
Nitrites/Nitrates	Below 1.0/10.0 ppm
Atrazine	Below 3 ppb
Simazine	Below 4 ppb
Total Chlorine	Below 4 ppm
pH	Between 6.5 and 8.5
Hardness	50 ppm or less

Who is Responsible for Monitoring Drinking Water?

A public water supplier is responsible for monitoring the quality of the water it produces. A public water supplier is any person who owns or operates a system that has more than 15 service connections or regularly serves an average of 25 individuals daily at least 60 days a year. The monitoring and compliance requirements vary by the number of people served by the system.

If the system is not large enough to be considered a public water system, EPA does not require any monitoring of the water. Some states may require monitoring. Typically, these systems consist of a private well that serves one or two homes.

Training and Qualifications

No licensing or certification is required or needed to test drinking water using the WaterSafe® kit. CEHRC Hazard Investigators should receive classroom training to follow the Drinking Water Sampling Instructions, understand these background materials, follow the test kit's instructions, know how to explain the results to the residents and understand the consequences of the results. The training should take about one hour. Hands-on practice with a trainer or experienced Hazard Investigator helps master the use of the kit.

Using the CEHRC Drinking Water Report

CEHRC's Drinking Water Report is designed to document the results of the test. Since the drinking water will not be commonly checked and there are many results, the results are not included in the Summary Results Report. Therefore, the Hazard Investigator will need to give a copy of the Drinking Water Report to the resident.

To help the Hazard Investigator, the Drinking Water Report includes guidance to the resident to indicate when more investigation is required and what sources of contamination need to be considered.

What Do the Results Mean?

The test kit is not used to determine compliance with the drinking water standards. Specific sampling and analysis methods that are more complex and costly than the WaterSafe® kit are needed for that purpose. Instead, it serves as a good screening tool to identify problems that need further investigation, especially for lead, bacteria, atrazine and simazine (the toxic pollutants). A positive result means that there may be a problem in the drinking water that needs to be investigated. Depending on the contaminant, the problem may represent a significant threat to human health, especially children's health.

Where a public water supplier is involved, a positive test result should trigger an investigation. The public water supplier has an ethical and, in many cases, a legal duty to do further checks. If they do not respond promptly, contact the state agency responsible for drinking water compliance.

If a public water supplier is not involved, the health department may take additional samples and require that the drinking water be made safe and meet the federal standards. Filters to effectively remove the contaminants from the water are relatively low cost but are only temporary. Efforts to protect the water supply from contamination are likely to be more complicated but more effective in the long run.

Explaining the Results to Residents

The CEHRC Drinking Water Report can be used to help in explaining the results to the residents. A copy of this report should be left with the resident. The following table provides the potential source of a contaminant that should be investigated.

Containment	Investigate If:	Potential Source of Containment
Bacteria	Positive for bacteria	Human or animal sewage
Lead	Positive for lead	Old lead piping or lead solder on copper piping
Atrazine/Simazine	Posititve for either pesticide	Herbicide runoff from farming or lawn care
Total Nitrate	More than 10 ppm	Fertilizer or failing septic tank
Nitrite	More than 1 ppm	Fertilizer or failing septic tank
Total Chlorine	More than 4.0 ppm	Too much disinfectant used to kill microbes such as bacteria

Other Measures	Investigate If:	Issue
pH	Less than 6.5 or greater than 8.5	Other containment may be present
Total Hardess	No investigation needed but should be below 500 ppm	High level indicates "hard water" which leaves coating on fixtures and affects taste. Low hardness indicates "soft water" which may cause lead or copper from piping to get into water

For more information…

Safe Drinking Water Hotline at 800-426-4791.

Silver Lakes Research Company – P.O. Box 686, Monrovia, CA 91017. Tel: 888-438-1942; www.watersafetestkits.com. They provide the test used by CEHRC.

Also see CEHRC's **Online Resources for Drinking Water**

DRINKING WATER: Sampling Checklist

❒ SAMPLING INSTRUCTIONS:

1. **Check the drinking water kit** and make sure it has all five items:

    a. Foil pouch for Pesticides (Pe) and Lead (Pb).

    b. Unlabelled plastic tube with lid.

    c. White strip labeled "pH Total Hardness Total Chlorine"

    d. White strip labeled "Nitrite & Nitrate Test"

    e. Instructions

Supplies:

❒ Drinking Water kit (e.g. WaterSafe)
❒ CEHRC Drinking Water Report

2. **Take water sample.** Only a couple of ounces are needed.

3. **Conduct Lead and Pesticide test.**

    · Use plastic dropper to take water from the glass and put into the plastic vial (the one in the foil pouch). Swirl.

    · Place the two test strips into the vial and wait 10 minutes.

    · Read Pesticide results. Read Lead results. Record results on Drinking Water Report.

4. **Conduct Bacteria test.**

    · Use the other (not in foil pouch) plastic vial.

    · Fill vial with water to ½ inch below the top of vial. Do not overfill.

    · Replace cap and shake vigorously for 20 seconds.

    · Place vial in a warm area for 48 hours, *after 48 hours, observe the color **without** opening.*

        o *Purple = negative (no bacteria)*

        o Yellow = positive (bacteria likely)

    · *Record results on Drinking Water Report.*

❒ 5. **Conduct Nitrite and Nitrate test.**

    · Put test strip into water sample for 2 seconds. Make sure paper pads are immersed in the water. Remove.

    · After 1 minute, match colors to chart on instruction form (from kit).

    · Colors are only stable for one minute. Record results on Drinking Water Report.

6. **Conduct pH/Total Hardness/Total Chlorine test.**

DRINKING WATER
Sampling Instructions

CEHRC's Drinking Water Sampling Instructions are intended to outline the steps Home Hazard Investigators should take in order to assess drinking water for contaminants. These materials complement CEHRC's training in drinking water hazard assessment for community-based organizations working to improve housing in high-risk communities through indoor environmental sampling activities.

These steps assume you have already decided which units to assess, completed the Visual Survey, have your supplies, have the resident's agreement to assess their home, and know how you plan to use the results. For more information on drinking water contaminants, please see the **Drinking Water Background Materials** and **Drinking Water Decision Guide.**

I.

Supplies

The following supplies are used to test drinking water for toxic contaminants such as lead, bacteria, atrazine, or fertilizer and other chemicals such as iron, chlorine, hardness and alkalinity.

II.

- ❑ WaterSafe® drinking water test
- ❑ CEHRC Drinking Water Report

These materials do not constitute endorsement of a particular product.

Avoid Common Mistakes

Accuracy: A negative result from the drinking water test kit does not indicate the water is safe, or unsafe to drink. It only tests for 8 out of almost 80 contaminants. In addition, the tests are only a screening tool. Positive results should be confirmed with a water sample that is analyzed by a drinking water laboratory. A local public water supplier or the local health department should be able to arrange for the sampling and analysis.

Don't Drip: Be sure that you squeeze the dropper completely and let it suck up the water sample. Don't squeeze it again until you are ready to put the sample in the plastic vial. If some of the sample drips outside of the vial, start over and suck up another dropper full of water.

III. Scheduling

Sampling drinking water will take only one visit and about 15 minutes with the WaterSafe® drinking water test kit.

Some drinking water tests insist that the water not be run for a period of time (12 hours or so) so that lead will accumulate in the water sitting in the pipes. This approach requires additional planning and cooperation on the part of the residents whose home is being tested. Use of the WaterSafe® kit by Hazard Investigators does not require this. While a lead result from pipes may be higher if the water is not used for a period of time, CEHRC's protocol is to be used as a screen for serious problems. Local projects may find it preferable to make the test more accommodating for the family, and therefore, should take water samples at whatever point in the day (and water use) possible. Letting the water sit in the pipes for a period of time may also cause problems with testing for bacteria and pesticides.

Sampling Instructions

These instructions are designed to complement the WaterSafe® kit instructions.

1. Check the Kit. Make sure the kit is complete. It should have five items:

· One foil pouch labeled Pesticides (Pe) and Lead (Pb)

· One unlabelled plastic tube with a lid shrink-wrapped to the tube.

· One white strip (about the size of a typical band-aid) labeled "pH Total Hardness Total Chlorine"

· One white strip (about the size of a typical band-aid) labeled "Nitrite & Nitrate Test"

· Instructions

2. Take Sample of Water

· Find a faucet, preferably one that has not been used since the previous evening. Use water at room temperature.

· Using a clean glass, fill the glass with water. Only a couple of ounces are needed.

3. Lead and Pesticide Test

· Open the foil pouch (Pe/Pb) and take out the contents.

· Check to make sure you have:

o Squeeze the top of the dropper to put the water in the vial. Use only one dropper full of water.

· Swirl plastic vial gently for several seconds and then place it open-end up on a flat surface.

· Place the two WaterSafe® test strips (Pesticide and Lead) into the vial with the arrows pointing down.

· Wait 10 minutes. Do not move the strips or the vial during this time. Blue lines will appear on the strips. (While you are waiting, you can start one of the tests for other contaminants.)

· Take the Pesticide (Atrazine/Simizine) strip out of the vial and read the results.

o If the blue line closest to the number 2 is darker or as dark as the blue line near the number 1, the test is positive. The atrazine levels are probably 3 ppb or more or the simazine levels are 4 ppb or more. These levels are over EPA standards.

o If the blue line closest to the number 1 is darker than the line closest to the number 2, the test is negative. The atrazine levels are probably less than 3 ppb or the simazine levels are less than 4 ppb. These levels are below EPA standards.

o If no lines appear or the lines are very light, the test did not run properly and the result is not valid.

· Take the Lead strip out of the vial and read the results.

o If the blue line closest to the number 2 is darker or as dark as the blue line near the number 1, the test is positive. The lead levels are probably 5 ppb or more. Any measured lead is over EPA's goal of zero, but it may not be more than EPA's Action Level of 15 ppb.

o If the blue line closest to the number 1 is darker than the line closest to the number 2, the test is negative. The lead levels are probably less than 5 ppb.

o If no lines appear or the lines are very light, the test did not run properly and the result is not valid.

o Record the results on the **Drinking Water Report** by circling "Positive" or "Negative" for Lead and for Atrazine / Simazine.

4. Bacteria Test

· Remove the plastic wrapper covering the white cap of the plastic vial that was not in the foil pouch. Set the vial upright on a flat surface.

· Twist off the cap of the vial and fill the vial with water to one-half inch (1/2") below the top of the vial. Do not overfill and do not spill the bacterial growth powder in the vial.

o If it is too difficult to fill the vial without overflowing it, a plastic dropper or regular spoon can be used to put the water into the vial. To avoid contamination of the sample, however, a new

· After 48 hours, observe the color of the liquid without opening the vial:

  o Purple Color: Negative Result (no bacteria detected)

  o Yellow Color: Positive Result (highly likely that sewage or fecal matter present in the water).

· If you get positive results, put a drop or two of bleach into the vial before pouring the mixture down the toilet. Wash hands carefully. Negative samples may be poured directly into the toilet. Discard vial in the trash.

· Record the results on the **Drinking Water Report** by circling "Positive" or "Negative" for Bacteria.

5. Nitrate / Nitrite (Fertilizer) Test

· Open the **Nitrate / Nitrite Test** packet and take out the test strip.

· Put the test strip into the water sample for 2 seconds. Make sure the two paper pads are immersed in the water.

· Remove the test strip from the water sample.

· After one minute, match colors to chart on the instruction form for the reading. The color tells you the approximate concentration of Nitrate and of Nitrite in the water. The darker the color, the greater the concentration.

· The colors are only stable for one minute.

· The result is positive and unsafe under EPA's standards if:

  o Total Nitrate / Nitrite levels are over 10 ppm; or

  o Nitrite levels are over 1 ppm.

· Record the results on the **Drinking Water Report** by writing in the parts per million (ppm) for Total Nitrate/Nitrite and for Nitrite.

6. pH / Hardness / Chlorine Test

· Open the **pH / Hardness / Chlorine Test** packet and take out test strip.

· Put the test strip into the water sample. Make sure the three paper pads are immersed in the water.

· Immediately remove the test strip from the water sample.

· Hold the strip flat (horizontal) for 15 seconds.

DRINKING WATER
Decision Guide

This guide is intended for project managers considering whether to test for contaminants in drinking water in homes as part of a community-based home hazard assessment program. **CEHRC's Drinking Water Sampling Instructions** provide step-by-step instructions that will help the Hazard Investigator use a commercially available kit that gives immediate screening results for several key drinking water contaminants. CEHRC's **Drinking Water Background Materials** offer added reference information.

What is the connection between healthy housing and drinking water? Problems in and around the home can impact the quality of drinking water in two distinct methods:

- If the piping is made or lead or the copper piping is joined with lead solder, lead can get into the drinking water. Copper can also do the same thing but the levels of copper are only toxic to fish.
- Contaminants such as pesticides, fertilizer, petroleum, and sewage can get into the water supply and be hazardous to users.

What is a public water supplier? Public water suppliers provides 90% of Americans with their drinking water. The public water supplier is responsible for providing safe drinking water. They must monitor the water regularly for certain contaminants and report the results annually to customers. The remaining 10% of Americans do not get their drinking water from a public water supplier. They get their water from wells, cisterns and springs that are not regulated by the U.S. Environmental Protection Agency (EPA) if they serve fewer than 15 service connections, and average fewer than 25 individuals daily for at least 60 days per year. While these homes are predominately in rural areas, some older urban areas still rely on wells for drinking water.

How many units should be tested in a multi-family building? Normally, testing only one unit or common area per building will give a good enough indicator of the water quality in units and areas throughout that building. CEHRC recommends testing one unit per building if each unit has their own sink or other water supply, or testing one common area in a building if each unit does not have its own sink or other water. For example, in a single-room occupancy (SRO) hotel, each room may not have its own sink and therefore, one common area water supply should be checked.

When should testing be conducted for contaminants such as pesticides, fertilizer, and sewage? The water should be checked on homes that get drinking water from a well, cistern or spring that not from a public water supplier. While these homes are mainly found in rural areas, some older urban areas still use wells for drinking water. Often the home will also have a septic system to handle sewage. The contamination problem is likely to be most severe in the spring from March to June when pesticides and fertilizer is applied and rain overloads sewers and septic system

If the home receives drinking water from a public water supplier, only test the water if the resident has specific concerns or the public water supplier already has a recognized problem with pesticides or fertilizer in the water. The public water supplier should already be monitoring the water throughout the system regularly and will provide a summary of the results.

When should lead in drinking water be checked? Few homes have enough lead in drinking water to cause lead poisoning. Deteriorated lead-based paint is the primary cause of lead poisoning. However, there is no safe or acceptable level of lead in the body. The risk is a special concern where the resident has an infant fed with formula. Infants are most susceptible to lead and water used to make up the formula in the middle of the night may the highest levels of lead in it.

Any home built before 1992 may have lead piping or lead solder. Whether the lead gets into the water depends on the "hardness" of the water. "Soft" water is a bigger problem. Hardness is a measure of the amount of calcium carbonate dissolved in the water. Therefore, homes with a water softener or water supplied from a lake or river are more likely to have lead in drinking water. Public water suppliers are required to provide a report by July 1 each year that indicates the typical lead levels in the community.

CEHRC only recommends checking for lead when:

- You are already checking for other contaminants;
- The resident has an infant that is getting baby formula; or
- The public water supplier already has a recognized problem with lead.

How should the water be checked? Many state health departments will analyze water samples for sewage contamination for free or at a small charge such as $10. Many commercial labs also analyze water samples. In addition, there are home test kits available that address several contaminants at once. CEHRC recommends using WaterSafe® Drinking Water Test kit by Silver Lakes Research Company. This kit is a good low-cost, screening tool that provides immediate results for the following dangerous contaminants:

- Atrazine and simizine – two pesticides commonly used in the Midwest and Southeast that frequently are found in drinking water supplies.
- Lead – from lead piping and lead solder.
- Nitrates / nitrites – from fertilizer, septic tanks, sewage, and natural sources.
- *Fecal coliform* – bacteria from human or animal sewage

What training is required? The kit is relatively easy to use. CEHRC Hazard Investigators should receive one-hour of classroom training to understand the background materials, learn how to use the testing kit and understand what the results mean and how to report them to the resident. With some practice and on-the-job oversight, the Hazard Investigator should be able to quickly and consistently use the kit.

How much does it cost? CEHRC uses the WaterSafe® drinking water kit. 50 kits cost $6.95 each. Individual kits cost about $13 each. Prices for other brands vary.

Any limits on scheduling of visits? No. The test takes one visit and can be completed in 15 minutes. The bacteria test takes 48-hours to process but a second visit is not needed. Some drinking water tests insist that the water not be run for a period of time (12 hours or so) so that lead will accumulate in the water sitting in the pipes. This approach requires additional planning and cooperation on the part of the residents whose home is being tested. Use of the WaterSafe® kit by Hazard Investigators does not require this. While a lead result from pipes may be higher if the water is not used for a period of time, CEHRC's protocol is to be used as a screen for serious problems. Local projects may find it preferable to make the test more accommodating for the family, and therefore, should take water samples at whatever point in the day (and water use) possible. Letting the water sit in the pipes for a period of time may also cause problems with testing for bacteria and pesticides.

Are there standards? Yes. U.S. Environmental Protection Agency has adopted specific standards for the contaminants. However, these standards only apply to a "public water supplier." A public water supplier is a system that has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year.

How useful are the results? The test kits are not used to determine compliance with the drinking water standards. Instead, they do serve as a good screening tool to identify problems that need further testing, especially for the toxic pollutants – lead, bacteria, atrazine and simizine.

Where a public water supplier is involved, a positive test result should trigger an investigation. The public water supplier has an ethical and, in many cases, a legal duty to do further checks. If they do not respond promptly, contact the state agency responsible for drinking water compliance.

If a public water supplier is not involved, the health department may take additional samples and require that the drinking water be made safe and meet the federal standards. Filters to effectively remove the contaminants from the water are relatively low cost but are only temporary. Efforts to protect the water supply from contamination are likely to be more complicated but more effective

Are there any safety concerns to Hazard Investigator? No.

What other potential downsides must be considered? WaterSafe® is a screening test. It cannot be used to certify water is either safe or unsafe to drink.

This test kit only screens for a few of the most common contaminants of concern. For example, it does not check for petroleum products, industrial chemicals, or arsenic that may be in the water supply. Finally, the lead test detects lead down to 5 parts per billion (ppb). While EPA has established a formal goal of zero lead in drinking water, its action level is 15 ppb. The test may be positive for lead even though the public water supplier is complying with the drinking water standards.

Drinking Water Report

Date Water Sample Taken: _____

Sampled by: _____

Source of Water Sample: _____

Resident: _____

Address: _____

_____

Unit #: _____ **Phone #:** _____

Notes: _____

_____

Contaminant	Result of Test	Investigate If:	Potential Source of Contaminant
Bacteria	Positive / Negative	Positive for bacteria	Human or animal sewage
Lead	Positive / Negative	Positive for lead	Old lead piping or lead solder on copper piping
Atrazine / Simazine	Positive / Negative	Positive for either pesticide	Herbicide runoff from farming or lawn care
Total Nitrate	ppm	More than 10 ppm	Fertilizer or failing septic tank
Nitrite	ppm	More than 1 ppm	Fertilizer or failing septic tank
Total Chlorine	ppm	More than 4.0 ppm	Too much disinfectant used to kill microbes such as bacteria

Other Measures	Result of Test	Investigate If:	Issue
pH		Less than 6.5 or greater than 8.5	Other containment may be present
Total Hardess	ppm	No investigation needed but should be below 500 ppm	High level indicates "hard water" which leaves coating on fixtures and affects taste. Low hardness indicates "soft water" which may cause lead or copper from piping to get into water

If the drinking water is from a public water supplier, contact the public water supplier. If a public water supplier is not involved, contact the local health department or call the Safe Drinking Water Hotline at 800-426-4791.