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Turning bad water good

By **BOB MONTGOMERY**
Mercury Staff Writer

What are you drinking?



EDITOR'S NOTE — Mercury reporter Bob Montgomery has spent three months in an extensive sampling of the municipal water systems in the Greater Pottstown Area.

While The Mercury survey found several locales with specific problems — TCE, a carcinogen, in high levels in Collegeville and Trappe; elements of gasoline in Exeter — the general finding was that municipal water systems in our area are providing their customers with safe, if not pure, drinking water.

POTTSTOWN — So your water is bad. Do you stop using it? Do you sell your home and move?

Before you make any rash decisions, you should know that there are many purification devices on the market from which to choose. Some are expensive, but most are reasonably priced, considering the long-term job they can do in purifying your water.

If you receive public water, it is the supplier's responsibility to make sure your water is safe. Safe doesn't mean pure, however.

If the level of trihalomethanes or TCE in your water still bothers you, the next step would be to install purification devices at your home.

Homeowners with private wells that are contaminated, or if you have levels of bacteria or chemicals which scare you, the next step also would be to treat the problem yourself by installing purification devices.

For example, if you want to eliminate industrial solvents such as TCE from your water, the most accepted treatment is an activated carbon filter.

If you only want to treat your drinking water at the tap, you can buy a small unit for \$150 to \$300 which will fit under your kitchen sink.

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The filters, made of carbon, usually need to be replaced once a year. Replacement filters cost anywhere from \$30 to \$80.

The device has a line which forces the water from the tap through the filter, and another line back to the tap again where the purified water flows.

Even if your water is safe, but tastes funny, these filters do a good job on improving the taste.

Rick Stump, laboratory director at Suburban Water Testing Labs, Frederick, said that some chemicals can also enter your body through showering.

So if you want to eliminate chemicals from all your water, you may want to buy a larger activated carbon filter unit to place in your basement where the water comes into the house. The units, about the size of a water heater, cost about \$700, according to Stump.

Filters need to be replaced every year, at a cost of around \$150.

On a larger scale, volatile organic chemicals can be removed from water systems by aeration. Air is injected into the water, and volatiles leave the water by vaporizing.

One water company in Warrington, Pa. installed an aeration system which successfully removed TCE from its water, Stump said. "It works real well," he said.

Bacteria is not a problem for most municipal water customers. But it can be a large problem if you have a private well. The state Department of Environmental Resources estimates that 60 percent of all private drinking water in the state is contaminated — primarily from bacteria.

The most commonly used systems for treatment of bacteria problems are ultraviolet purifiers, chlorinators and iodination.

The ultraviolet purifier has a lamp (similar to a fluorescent tube) inside a quartz jacket. The ultraviolet light breaks down the bacteria structure and causes the bacteria to die when the water passes through the chamber.

The ultraviolet system is widely recommended by experts because it works. It costs between \$500 and \$800.

Chlorinators utilize regular household bleach (5 percent solution in water is recommended). A typical system utilizes about two gallons of bleach a month.

"It is fairly inexpensive to operate a chlorinator," said Stump. "But it's more prone to break down because of the number of moving parts it has."

Each chlorinator should include a "kill tank," a tank where the chlorine gets a chance to work on killing the bacteria. Chlorine doesn't kill all bacteria instantly, Stump said, and a kill tank is essential if you expect 100 percent purification.

The chlorinators run from \$475 to \$800, and the kill tanks cost around \$100 to \$125, Stump said.

Iodine can be used to disinfect water and make it safe for human consumption. A small quantity of an iodine solution mixed with the water will kill most bacteria and disease producing organisms in about 30 minutes of contact time.

The U.S. Environmental Protection Agency recognizes iodination as being a satisfactory method of disinfection, but recommends its use for emergency purposes only. Long-term exposure to iodine may, in some instances, have an adverse effect on pregnant women or persons with an impaired thyroid function.

If you are considering the purchase of a water softener, keep in mind that the softener has no effect at all on the bacteria or chemical content of the water. The purpose of a softener is to remove inorganics such as barium, cadmium, copper and radium; and to protect water pipes in the house as well as cut down on the amount of soap used by the homeowner.

"If you have radioactive water, a softener removes the radioactivity," said Stump. "It has an 85 percent removal rate."

Although your water will be radioactive-free, the radium residue is left in the softener and you have the problem of what to do with it.

Another device commonly used in this area is an acid neutralizing filter. Because much of the water is acidic, these devices can provide water with a balanced pH factor. The filter, which contains a solution containing baking soda, costs in the neighborhood of \$500 to \$800, according to Stump.

One device that is gaining in popularity is a "reverse osmosis" system. The water is forced through a membrane. The process — by putting pressure on the water — removes minerals. In the same unit, a carbon filter removes organic chemicals.

Used to turn saltwater into drinking water, the reverse-osmosis system also removes turbidity, dissolved solids, bacteria, viruses, pyrogens (fever-causing substances), hydrocarbons, asbestos, and most pesticides. It doesn't remove chloroform, however.

Stump, who has one of these systems in his home, said the system sells for \$600 to \$700.

Spring water companies routinely inject ozone to disinfect the water and assure that it's bacteria-free.

Ozone, which is electrically produced oxygen in gas form, is injected into the water. Stump said it leaves behind no taste or odor, and "has no apparent side effects."

Distillation is a simple method of treatment, but it doesn't necessarily remove chloroform and other organic chemicals which are volatile.

With distillation, water is heated until it turns to steam and then the steam is condensed into water. It supposedly removes bacteria, but since volatiles can vaporize with the water and recondense, the process can't get rid of any chemicals present.

What are you drinking?



Hot water

Water-borne radon could be serious health hazard

By TERRY BRENNAN
Mercury Editor

Of all the pollutants which can invade our drinking water supplies — either private or municipal — radioactivity is probably the most frightening.

While long-term studies to determine the effects of radioactive pollutants in our water are not available, it's clear that any water-borne radioactivity could be extremely dangerous.

Though possible, the radioactive contamination of municipal water supplies is unlikely. What is more likely is contamination which would come from radon in private well water.

And, just as the national awareness of the danger of radon gas in the home has grown, so has the awareness of the dangers of radon-contaminated well water.

At the Indoor Radon Conference held recently in Philadelphia, experts in the field of radon contamination indicated that water-borne radon — while not as critical a problem as air-borne radon — could become a serious health hazard in some homes.

The Pennsylvania Department of Environmental Resources initially established a safety limit of 100,000 picoCuries/liter (pCi/l); the established standard for testing radon in water) and has since lowered that recommended guideline to 10,000 pCi/l.

Tim Hartman, spokesman for the DER, said that no "standard" has been established, but that "one standard bandied about by most officials — when they begin to have concern — is 20,000 picoCuries per liter. What may be set nationally is a safety limit of 20,000 picoCuries per liter."

Some of the "hot homes" in Colebrookdale — on so-called Radon Hill — have water-borne radon well above the present and proposed limits. The Kathy Varady house has 29,000 pCi/l of radon in its water.

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The Kay Jones house has recorded 70,000 pCi/l of radon in its water.

And one home in Colebrookdale, which had only .02 working levels of radon in the air — the maximum safety limit of air-borne radon — was found to have 94,000 pCi/l of radon in its water.

Officials of the Environmental Protection Agency have found private wells in Maine which have tested out at more than one million picoCuries/liter of radon.

The problem of water-borne radon is not so much in the ingestion of the radon contaminated water, but in the dispersal of deadly radon daughters into the home's atmosphere from the water supply.

"Radon would rather be in the air than in the

water," said Howard Pritchard, a researcher from the University of Texas who presented a paper, "Water as a source of indoor radon" at the Philadelphia conference. "And as the temperature of the water increases, the propensity of the radon daughters to leave the water and disperse into the air also increases.

"But homes in North America use a lot of water and much of that radon can be expected to leave the water and enter the house atmosphere. About 35 percent of the radon in the air of some houses comes from the water," said Pritchard.

While the DER sees 10,000 or 20,000 pCi/l as the acceptable limit, one technician who works in radon remedial projects said at the recent Philadelphia

conference that, "I particularly don't want to breathe the air around water that has 1,000 picoCuries per liter of radon."

But there is a flip-side to water-borne radon. It is relatively easy to control.

If you had a high level of radon in your water, a 15-minute shower would increase your exposure levels to high concentrations of freshly liberated radon daughters dramatically. However, ventilation from a simple bathroom exhaust fan will at the same time decrease those levels dramatically, creating a safe environment.

It is also fairly simple to attach an activated carbon filter to the home's water intake pipe. Those filters are very effective in cleansing radon from the

water. A water softener will also remove any radium (the source of radon) from the water, but you are then left with the problem of radium collecting in the water softener.

There are also ventilation systems which have greatly reduced the level of radon in water.

Rick Stump, laboratory director of Suburban Water Testing Laboratories, said that there are two labs in the state certified for "radiation" testing, but none which are certified yet for radon testing.

If you are concerned about possible radon levels in your water, Jerry Centofanti of the state DER office in Norristown suggests you call the radon hotline (1-800-237-2366) for information.