

# Annual Report on Water Quality

FORT BELVOIR

JUNE 2004

A close-up photograph of a clear glass filled with water. A slice of lime is perched on the rim of the glass. The water is clear and has some condensation on the glass. The background is a soft, out-of-focus light green.

*This is Fort Belvoir's annual report on water quality in accordance with the 1996 Safe Drinking Water Act. The data in this report are a result of drinking water quality testing performed in 2003.*

## Q. Where does lead in drinking water come from and should I be concerned?

A. In 1986, lead was banned from being used in pipe and solder. In older homes where lead is present in pipe and solder connections, it may dissolve into the water after the water sits for long periods of time. The water that Fort Belvoir purchases from Fairfax Water contains a corrosion inhibitor to slow this dissolution process down. Fort Belvoir tests the water for lead according to EPA regulations and the water has always tested well below EPA limits. More information on lead is available on page 4.

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## What Is The Source of Your Drinking Water?

The drinking water Fort Belvoir distributes to its 23,500 consumers is purchased from the Fairfax County Water Authority. The Fairfax County Water Authority has four drinking water treatment facilities that feed an interconnected distribution system. The Fairfax County Water Authority serves the majority of northern Virginia and is Virginia's largest water utility. The treatment plants draw and treat water from the region's rivers and reservoirs to produce potable drinking water for its many customers.

## Is Your Water Safe to Drink?

Absolutely! Fairfax County Water Authority monitors both the sources and distribution system up to the Fort

Belvoir gates. Fort Belvoir's Environmental and Natural Resource Division monitors the distribution system on post. Based on this monitoring, your water complies with the standards set by the U.S. Congress in the Safe Drinking Water Act of 1974 and its revisions in 1986 and 1996.

All drinking water, including bottled drinking water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the U.S. Environmental Protection Agency's (EPA's) Safe Drinking Water Hot Line (800-426-4791).

The EPA regulates the amounts of various contaminants that are acceptable in public drinking water. The Virginia Department of Health enforces these regulations.

**Q. Who makes the rules and regulations for drinking water?**

**A.** Regulations are made by both federal and state agencies. The Safe Drinking Water Act (SDWA) was passed by Congress in 1974 and amended in 1986 and 1996. It is governed by the United States Environmental Protection Agency (EPA). The Web site for these standards is <http://www.epa.gov/safewater/standards.html>. In addition to the SDWA, the EPA has promulgated several specific rules, including the Total Coliform Rule and the Lead and Copper Rule, to address various types of water contaminant problems.

**Q. Why does my water sometimes have a chlorine taste and odor?**

**A.** During the months of April, May, and June you may notice the taste and odor of chlorine in your water. This is because, during this time, we use free chlorine, which provides the best method of disinfection during the water main flushing done each spring to maintain a high level of water quality. Keeping an open container of drinking water in the refrigerator allows the chlorine to dissipate, which usually improves the taste of the water.

## Water Treatment



Water must be treated to be safe to drink. Treatment includes physical and chemical processes. When raw water from the river enters the treatment plant, chemicals classified as coagulants are added to make small particles adhere to one another and settle. The water is filtered to remove the particles that didn't settle. Chemicals are then added: chlorine to kill harmful bacteria and viruses, a corrosion inhibitor to minimize dissolution of lead used in older household

plumbing, and fluoride to protect teeth. If the raw water has an odor or unpleasant taste, powdered activated carbon and potassium permanganate are added to the treatment process. Fort Belvoir receives chlorinated water and distributes it on post. Fort Belvoir monitors and ensures a chlorine residual is maintained throughout the distribution system. The presence of chlorine in the distribution system inhibits the growth of bacteria.

## What Is Being Done to Improve Fort Belvoir's Water Quality?

### Fort Belvoir

The Directorate of Public Works is continuously striving to provide better service to its customers. Drinking water projects which have recently been completed, or are currently in progress, include: annual flushing of the water distribution system; removal of water mains in areas where buildings have been demolished; completed a vulnerability assessment; and updating the computer model of Fort Belvoir's distribution system.

### Fairfax County Water Authority

Fairfax County Water Authority is dedicated to meeting all Federal water quality regulations. A new state-of-the-art drinking water treatment facility, which will replace three of the four existing treatment plants, is scheduled to be completed and in operation by mid-2005. The current station will pump water to the existing treatment plants until the new treatment plant is ready for start-up. This facility will be capable of pumping 120 million gallons of drinking water daily. In addition, a new raw water pumping station was brought on-line in 2003. More information on these projects is available on the Fairfax County Water Authority's Web site: <http://www.fcwa.org>.

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# DISTRIBUTION SYSTEM WATER QUALITY

## Testing of Process Water

The Fairfax County Water Authority monitors the process water and the finished water. Turbidity is a measure of the cloudiness of water in units called NTU (nephelometric turbidity unit). Turbidity in excess of 5 NTU is just noticeable to the average person and is usually caused by suspended matter or impurities that interfere with the clarity of water. Turbidity has no health effects and is not a direct indicator of health risks. However, turbidity is monitored because it is a good indicator of the effectiveness of the filtration system. Turbidity levels are measured by Fairfax County Water Authority during the treatment process after the water has been filtered, but before disinfection. The turbidity level of filtered water shall be less than or equal to 0.5 NTU in at least 95% of the measurements taken each month, and shall at no time exceed 5 NTU.

## Microbiological Contaminants Results

During calendar year 2003, three samples collected during routine monthly sampling tested positive for total coliform. However, when these samples were recollected and analyzed, they were negative for total coliform. This table lists the results of our microbiological testing, which is required by the EPA. The MCL requirement for total coliform bacteria, which are naturally occurring in the environment, is that samples with a presence must not exceed 5% of the total number of monthly samples.

## Lead and Copper Results

Infants and young children typically are more vulnerable to lead in drinking water than the general population. Lead and copper are monitored in 31 of our customers' homes. The Lead and Copper Rule requires that 90% of the samples from high-risk homes must have levels less than 15 ppb of lead and 1.3 ppm of copper. Fort Belvoir's most recent samples had lead levels of 3 ppb and copper levels of 0.059 ppm. The number and location of sample sites are based on Fort Belvoir's population and plumbing conditions. The EPA requires us to analyze the first water drawn out of the faucet in the morning. Since water sits in your plumbing system's pipes overnight, it can contain dissolved lead and copper. Because of Fort Belvoir's past excellent lead and copper results, we have been placed on ultimate reduced monitoring, requiring us to collect 30 samples every three years. Lead and copper results were last collected in 2001, and the next lead and copper sampling event is scheduled for 2004. If you are concerned about potential elevated lead levels in your home's water and would like to minimize their levels, simply flush the tap water for 30 seconds to two minutes prior to using for cooking or drinking. For more information on lead and copper in drinking water, call the Environmental and Natural Resource Division at (703) 806-4007.

## Total Trihalomethanes (TTHMs) and Five Haloacetic Acids (HAA-5)

Trihalomethanes (TTHMs) and haloacetic acids (HAA-5s) are compounds that can be formed when drinking water is disinfected with chlorine. The chlorine combines with naturally occurring organic matter in the water to form TTHMs and HAA-5s. Fairfax County regulates its chlorination process to minimize TTHM and HAA-5 formation. These disinfection byproducts are suspected carcinogens and are regulated by the EPA. The EPA limit for 2001 was 100 parts per billion (ppb) for TTHMs based on a quarterly running annual average for the entire system. The quarterly running annual average is calculated by averaging the current quarter's results with the previous three quarters' results. This limit was lowered to 80 ppb in 2002. In addition, an HAA-5 limit of 60 ppb became effective in 2002. The Fort Belvoir water system did not comply with the Primary Maximum Contaminant Level for Total Haloacetic Acids (HAA5) for the 2nd quarter 2003 monitoring period. The average level of HAA5 for this monitoring period was 68 ppb. The Fort Belvoir water system returned to compliance during the 3rd quarter 2003 monitoring period. Fort Belvoir notified its water customers as required by law. This does not represent an immediate risk. You do not need to use an alternative (e.g., bottled) water supply. However, if you have specific health concerns, consult your doctor. Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of developing cancer.

## Testing of Process Water – Total Organic Carbon

MCLG	N/A
MCL	TT <sup>5</sup> (Ratio)
Quarterly Running Annual Average	1.1
Minimum	1.0
Maximum	1.6
Major Source in Drinking Water	Naturally present in environment
Violation (Yes/No)	No

## Testing of Process Water – Turbidity

MCLG	TT (NTU)
MCL	TT (NTU)
Average Annual Turbidity	0.08
Highest Single Measurement	0.75
Lowest Monthly % Samples Meeting Treatment Technique Turbidity Limit	99.995%
Major Source in Drinking Water	Soil runoff
Violation (Yes/No)	No

## Microbial Contaminants – Total Coliform Bacteria

MCLG	0
MCL	Presence not to exceed 5% of monthly samples
Fort Belvoir's Results	3 of 358 samples tested positive, were negative upon retest
Meets EPA Standards	Yes
Major Source in Drinking Water	Naturally present in the environment
Violation (Yes/No)	No

## Summary of Finished Water Characteristics

Components	Fairfax County Water Authority Water Treatment Plants						
	MCLG	MCL	Average	Minimum	Maximum	Violation	Major Source in Drinking Water
2,4-D (ppb)	70	70	0.13	ND	0.31	No	Runoff from herbicide used on row crops
Atrazine (ppb)	3	3	0.1	ND	0.5	No	Runoff from herbicide used on row crops
Dalapon (ppb)	200	200	0.22	ND	1.36	No	Runoff from herbicide used on rights of way
Simazine (ppb)	4	4	0.05	ND	0.2	No	Herbicide Runoff
Chloroform (ppb)	NRL	NRL	26.7	6.7	66.2	No	By-product of drinking water disinfection
Bromodichloromethane (ppb)	NRL	NRL	7.1	2.5	13.9	No	By-product of drinking water disinfection
Chlorodibromomethane (ppb)	NRL	NRL	1.5	0.7	2.7	No	By-product of drinking water chlorination
Metolachlor (ppb)	NRL	NRL	ND	ND	0.3	No	Runoff from herbicide used on row crops
Barium (ppm)	2	2	0.04	0.02	0.07	No	Discharge of drilling wastes; discharge from metal refineries; erosion from natural deposits
Fluoride (ppm)	4	4	0.8	0.3	1.3	No	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
Nitrate [as Nitrogen] (ppm)	10	10	1.2	0.6	1.8	No	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Nitrite [as Nitrogen] (ppm)	1	1	ND	ND	0.05	No	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Beta/alpha Emitters <sup>2,3</sup> (pCi/L)	0	50	4.2	3.4	6.0	No	Decay of natural and man-made deposits
Alpha Emitters <sup>3</sup> (pCi/L)	0	15	0.7	0.2	1.2	No	Erosion of natural deposits

Metals	Copper	Lead
Action Level (AL)	1.3 ppm	15 ppb
Fort Belvoir 90th Percentile	0.059 ppm	3 ppb
Number of Sites at Fort Belvoir above 90th Percentile	0	1
Meets EPA Standards	Yes	Yes
Major Source in Drinking Water	Corrosion of household plumbing systems	Corrosion of household plumbing systems
Violation (Yes/No)	No	No

Total Trihalomethanes and HAA-5	TTHMs	HAA-5
Running Annual Average MCLG	0 ppb	0 ppb
Running Annual Average MCL <sup>4</sup>	80 ppb	60 ppb
System Running Annual Average	59 ppb	56 ppb
System Range	18-110 ppb	17-146 ppb
Meets EPA Standards	Yes	N/A
Major Source in Drinking Water	By-product of drinking water disinfection	By-product of drinking water disinfection
Violation	No	Yes <sup>6</sup>

### Footnotes

1. Testing performed in 1998.
2. The MCL for the Beta particles is written as 4mrem/year. EPA considers 50 pCi/L to be the level of concern for Beta particles.
3. Testing performed in 1999.
4. MCLs of 80 ppb for TTHMs and 60 ppb for HAA-5 proposed in the Interim Enhanced Surface Water Treatment Rule (IESWTR) became effective Jan. 1, 2002.
5. Total Organic Carbon has no health effects. However, it provides a medium for the formation of disinfection byproducts. These byproducts include TTHMs and HAA-5s. Compliance with the treatment technique reduces the formation of these disinfection byproducts.
6. The Virginia Department of Health issued a Notice of Violation to Fort Belvoir for non-compliance with the MCL for HAA5 during the July 2002 through June 2003 monitoring period.



## Source Water Characteristics

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and radioactive material, and can pick up substances resulting from the presence of animal or human activity. Contaminants that may be present in source waters include:

- Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production. These contaminants can also come from gasoline storage, urban storm water runoff, and septic systems.
- Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

## Source Water Assessment and Protection

In accordance with the 1996 Amendments to the Safe Drinking Water Act, the Virginia Department of Health has developed a comprehensive program to find better ways to protect our water sources. The Fairfax County Water Authority has partnered with Virginia Department of Health to conduct a detailed source water assessment and develop a source water protection program. After the assessment is conducted, you will be provided with information about potential sources of contamination and measures being taken to reduce or eliminate the sources of contamination.

The Fairfax County Water Authority will conduct an inventory of potential sources of contamination within the watershed above each intake and field survey land use activities and potential sources of contamination within a five-mile radius upstream of each intake.

The potential sources of contamination inventory will begin with the total area draining directly to the water supply and its tributaries. This area is approximately 170 square miles.

In the future, the Water Authority hopes to expand on this work by performing an inventory on the entire watershed, as well as working with neighboring water suppliers to obtain additional information about the region's surface waters.



## Q. Can I store my drinking water indefinitely?

**A.** No. The disinfectant in drinking water will eventually dissipate even if it is stored in a closed container. Some experts believe that water could be stored in a closed container up to six months before needing to be replaced.

## Q. Do I need to treat the tap water in any way before I place fish in an aquarium?

**A.** Chlorine is used for disinfection purposes, which can be harmful to fish if not dechlorinated prior to placing fish in it. Two types of chlorine are used: free chlorine and chloramines. Chloramines are normally used from July through March, and free chlorine is used from April through June. Free chlorine and chloramines dechlorination are performed differently. Chemical additives with directions for dechlorinating either free chlorine or chloramines from water for use in fish tanks or ponds are available at pet/fish supply stores.

## People at Risk

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons (such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders), some elderly, and infants can be particularly at risk from infections. These people should seek advice from their health care providers about drinking water. EPA/Center for Disease Control guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the EPA's Safe Drinking Water Hotline (800-426-4791).



## Abbreviations and Definitions

Contaminants in your drinking water are routinely monitored according to Federal and State regulations. The tables in this report show the results of monitoring for the calendar year 2002. In the tables and elsewhere in this report you may find terms and abbreviations you might not be familiar with. The following definitions are provided to help you better understand these terms:

**Action Level (AL):** The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

**Total Coliform:** A bacteria test which indicates that potentially harmful bacteria may be present.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

**NRL:** No regulatory limit.

**ND:** Non-detect, laboratory analyses indicate that the contaminant is not present.

**ppm:** Parts per million or milligrams per liter (mg/L). Corresponds to one penny in \$10,000.

**ppb:** Parts per billion or micrograms per liter (ug/L). Corresponds to one penny in \$10,000,000.

**pCi/L:** Picocuries per liter, a measure of radioactivity in water.

**Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

## If You Have Questions...

The point of contact at Fort Belvoir for water quality information is **Patrick McLaughlin, Division Chief, Environmental and Natural Resource Division (703-806-4007) or e-mail [environmental@belvoir.army.mil](mailto:environmental@belvoir.army.mil)**. For questions or information on the Fairfax County Water Authority treatment facilities and treatment processes, contact the Authority at 703-698-5800. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791) or on EPA's Web site at: <http://www.epa.gov/safewater/index.html>.

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**IMPORTANT**

**Drinking Water Quality Information Inside**

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