



Marine Corps Base Quantico Mainside Water System (PWSID 6153675)



2019 Annual Drinking Water Consumer Confidence Report



Message from the Public Works Officer

The Public Works Branch (PWB) of the Marine Corps Base Quantico G-F, Installation and Environment Division, is pleased to present the Base's Mainside Annual Water Quality Report. The Mainside Water System routinely conducts drinking water quality monitoring through numerous water quality tests according to State and Federal regulations. This report summarizes our water quality monitoring results for the period **January 1 through December 31, 2019**.

Our Mainside water system (PWSID No. 6153675) utilizes protected surface water sources via Mainside Water Treatment Plant using its conventional treatment process (coagulation, flocculation, precipitation, filtration and disinfection process) and delivers water to Base's Mainside (located in east side of I-95).

Our goal is to provide you with a safe and dependable supply of drinking water. To help us meet this goal, we have established a Water System Working Group (WSWG) Team with personnel from water treatment plant, Utility Shop, Facility Maintenance Section, Engineering Section, Utility Section and Natural Resource & Environmental Affairs Branch to proactively address water quality concerns and issues. The followings are some of our recent efforts and changes implemented to improve our water quality:

- 1) Sodium permanganate feed system (an additional treatment process to reduce formation of disinfection byproducts) has been installed in Mainside Water Treatment Plant and has been operational since January 2020.
- 2) Uni-direction flushing (UDF) program has been implemented to systematically and comprehensively flush Mainside water mains twice a year (During Spring and Fall Seasons) to further ensure water quality in the Mainside water system.

- 3) Implemented periodic spot flushing and variable tank level operation to reduce water age (water retention) and to increase water turnover in the distribution system.
- 4) Implemented comprehensive water storage tank inspection and cleaning program and raw water line flushing.
- 5) Currently conducting Mainside water treatment repair and Renovate project including chemical feed system upgrade and control system upgrade. This project will help us to optimally operate the water treatment plant for better finished water quality with modernized chemical feed systems and control systems.
- 6) Implemented compliance water quality monitoring tracking program to systematically track compliance sampling and tests. Through the dedicated work of our Water Commodities Manager, Dr. Hunho Kim, our WSWG, and our 24/7 Plant Operators and Helpers, our water quality has been improved over the past year (i.e., disinfection byproducts) and we will continue to ensure safe drinking water to our families and Quantico community..

CDR Angelique McBee, P.E.

Public Works Officer, Marine Corps Base Quantico

We Want To Hear From You

In order to meet increasingly stringent water quality requirements, we are constantly planning and funding projects to address many water-related issues including source water protection, system operation and maintenance improvement, and timely upgrade and replacement of water system infrastructure (pipes, pump stations and tanks) and treatment plant facility. We value your inputs on our water quality and water system related issues. You can call us at 703-432-2466 (PWB Water Commodities Manager) for any water related questions and inputs. To stay informed on important water related public notifications, please visit us on line at <https://www.quantico.marines.mil/water-quality/>.

Regarding This Report

This report contains summarized information on all regulated contaminants found in your drinking water based on water quality tests performed for a variety of contaminants. An explanation of the results is included in a data table at the end of this report.

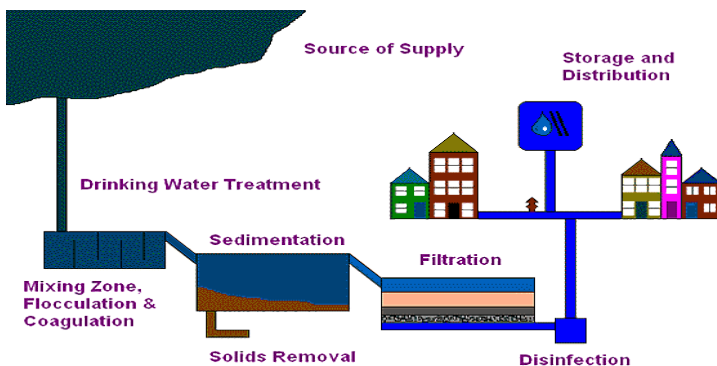
Maximum Contaminant Levels (MCL's) are set at very stringent levels by the USEPA. In developing the standards USEPA assumes that the average adult drinks 2 liters of water each day throughout a 70-year life span. USEPA generally sets MCL's at levels that will result in no adverse health effects for some contaminants or a one-in-ten-thousand to one-in-a-million chance of having the described health effect for other contaminants.

Sources of Water

All of the water sources for MCB Quantico Mainside System are located inside of the MCB Quantico Base territory and protected from general public access. However, if you witness any illegal activities (e.g., illegal dumping) around or in base waterways, please report your observations to MCB Quantico Security Battalion at 703-784-2251. The Virginia Department of Health (VDH) conducted a source water assessment in 2002. The purpose was to determine the relative susceptibility of the source water to activities in the watershed. Our source water was calculated to have a high susceptibility to contamination due to ongoing Base activities, and we routinely check and mitigate runoff potential. There was no evidence of contamination of the water source in any of our testing.

Mainside Water Treatment Plant

The Mainside Water Treatment Plant (with a design capacity of 3.17 million gallons per day) provided an average of approximately 1.0 million gallons per day in 2019, through approximately 59 miles of water line. Mainside Water Treatment Plant treats source water through its conventional water treatment process (coagulation, flocculation, sedimentation, filtration and disinfection). There is an ongoing "Mainside water treatment repair and renovate project" upgrading its chemical feed system, control system and other facility equipment.



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Potential Sources of Water Contaminants

Breckenridge Reservoir is the principal source of water for Mainside Water System. About 17.4 square miles of land drain into the Breckenridge Reservoir. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and in some cases radioactive material and can pick up substances

resulting from the presence of animals or from human activity. Contaminants that may be present in source water 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 byproducts of industrial processes and petroleum production, and can also come from gas stations, 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, USEPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. U.S. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water. Drinking water, including bottled water, may reasonably be expected to contain at least a small amount of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about drinking water contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline at 1-800-426-4791 or visiting their website at <https://www.epa.gov/ground-water-and-drinking-water>.



Should Some People Take Special Precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immune system compromised persons such as persons with cancer undergoing chemotherapy, people who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly and infants can be partially at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the USEPA Safe Drinking Water Hotline at 1-800-426-4791.

We strongly recommend that our customers not use water from the hot water tap for consumption. Any contaminants found in the water may accumulate in the hot water tank. This would be true anywhere, regardless of the water source. This does not mean that there is anything wrong with our drinking water. All water tests are conducted on water from the cold-water tap. Our concern is that the water quality is unknown when water from the hot-water tap is consumed. We believe you are better served by heating cold-water for this purpose.

Microbial Analysis

Total Coliform: *Coliforms* are bacteria that are present naturally in the environment and are used as an indicator that other, potentially harmful bacteria, may be present. When Coliform bacteria are found, special follow-up tests are done to determine if harmful bacteria are present in the water supply. If the limit is exceeded, the water supplier must notify the public by newspaper, radio, or television. We are proud to announce that we did not have any samples test present for coliform during the 2019 calendar year.

Disinfection Byproducts

MCB Quantico Mainside Water System collects disinfection byproducts samples (including Total Trihalomethanes and Haloacetic Acids samples) from 4 different locations every quarter.

The locational running annual average of Total Trihalomethanes (TTHM) calculated for 2019 first quarter (average of 2018 second quarter, third quarter, fourth quarter and 2019 first quarter data) from “2700 Block Tank” location was 83 parts per billion (ppb) and exceeded the Primary Maximum Contaminant Level (MCL) of 80 ppb. Similarly, the locational running annual average of TTHM calculated for 2019 second quarter (average of 2018 third quarter, fourth quarter, 2019 first quarter and second quarter data) from “Wastewater Plant Administration Building” location was 83 ppb and exceeded the Primary Maximum Contaminant Level (MCL) of 80 ppb.

During October 2019 we did not monitor or test for Total Organic Carbon (TOC) from both source water and treated water, and also alkalinity from source water (i.e, disinfection byproduct precursors) and therefore cannot be sure of the quality of our drinking water during that time. Disinfection byproduct precursors do not represent a health risk, but are monitored because they provide an indication of treatment efficiency to reduce formation of disinfection byproducts, like total trihalomethanes (THMs) and haloacetic acids (HAAs).

Some people who drink water containing trihalomethanes in excess of the MCL over many years could experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer.

However, during the 2019 third quarter and fourth quarter monitoring, none of annual running averages from all required disinfection byproducts samples exceeded Total Trihalomethanes (TTHM) MCL (80 ppb) and Haloacetic Acids (HAA5) MCL (60 ppb). In other words, MCB Quantico Mainside Water system is in compliance with TTHM and HAA5 MCLs since the 2019 third quarter.

We have implemented disinfection byproducts reduction measures (including uni-directional flushing program, water storage tank turn-over practice, water storage tank inspection & cleaning, spot flushing, etc.) and these recent operational efforts improved our water quality (i.e., TTHM and HAA5 reduction). In addition, we have added “Sodium Permanganate” feed system to our treatment process (since 2020 January) to reduce the organics in our source water. Natural organics are precursors to disinfection byproducts when chlorine is added. We anticipate further water quality improvement through this treatment process coupled with our systematic comprehensive unidirectional flushing protocol of our water distribution system and improved operational efforts.

Lead and Copper

During 2019, we completed all required testing for lead and copper and 90 percentiles of all lead and copper test results were less than their action levels (15 ppb for lead and 1.3 ppm for copper). One site (a sample from Building 2009) out of 30 required sampling sites exceeded copper action level of 1.3 ppm (showing 2.1 ppm of copper). None of samples exceeded lead action level of 15 ppb.

More information about drinking water contaminants and potential health effects can be obtained by calling the USEPA’s Safe Drinking Water Hotline

at 1-800-426-4791 or visiting their website at <http://water.epa.gov/drink/index.cfm>. If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Marine Corps Base Quantico is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components.

When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 15 to 30 seconds, until it becomes cold or reaches a steady temperature before using the water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the USEPA’s Safe Drinking Water Hotline at 1-800-426-4791 or visit <https://www.epa.gov/ground-water-and-drinking-water/basic-information-about-lead-drinking-water>.

Metals

During the 2017 - 2019 monitoring period, we did not monitor or test for Metals and therefore cannot be sure of the quality of our drinking water during that time. We will collect the missed samples during the 2020 - 2022 monitoring period.

Unregulated Contaminant Monitoring Rule 4

The Safe Drinking Water Act (SDWA), as amended in 1996, requires the USEPA to establish criteria for a program to monitor unregulated contaminant and publish a list of contaminants to be monitored every five years.

USEPA published the first set of contaminants in 1999. Unregulated Contaminant Monitoring Rule 4 (UCMR4) sampling began in April 2018 and continued in 2019. Safe Drinking Water Act (SDWA) requirement mandated publishing the next set of unregulated contaminants to be monitored and the requirements for such monitoring. Implementation of this final rule benefits the environment by providing USEPA and other interested parties with scientifically valid data on the occurrence of the contaminants in drinking water; thereby, permitting the assessment of the population potentially being exposed and the levels of exposure. These results are the primary resource of occurrence and provide exposure data for the USEPA to determine whether to regulate these contaminants.

To view Contaminant List for UCMR4 testing, go to:

<http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/ucmr4/index.cfm>

Cryptosporidium in Source Water

Cryptosporidium testing from MCB Quantico Mainside Water System source water was completed in October 2018 and results indicate that MCBQ Raw Source Water is safe to consume once treated. EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the USEPA’s Safe Drinking Water Hotline (1-800-426-4791).

Conclusion

Our utilities sections work around the clock to provide top quality water to our families, co-workers and Quantico Community. In order to maintain a safe and dependable water supply we will continue to make improvements to our treatment facility and supply lines that benefits all of our customers. As announced in the Base newspaper, *The Quantico Sentry*, water mains and fire hydrants are flushed twice a year through our systematic uni-directional flushing program. This may cause temporary water discoloration which can be resolved by running the tap until the water is clear. Please help us in our goal of ensuring a safe and sustainable water system by careful use of this resource, which is the heart of our community, our way of life and our children’s future.

Quantico Marine Corps Base Water Quality Report Mainside 2019

Microbiological Results	MCLG	MCL	No. of Samples Indicating Presence of Bacteria	Highest no.	Number of Monthly Samples	Violation	Major source in drinking water.	
Total Coliform Bacteria	0	One positive sample per Month	0	NA	15	No	Naturally present in the environment	
Fecal Coliform	0	A routine sample & a repeat sample are coliform positive & one is also fecal coliform.	NA	NA	NA	No	Naturally present in the environment	
We are proud to report that there were no Total Coliform samples that tested present for coliform during 2019.								
Primary Regulated Contaminants								
Metals (units)	MCLG	Action Level	90th Percentile	Number of sites tested	No. of Sites Exceeding action level	Range Low to Highest	Violation	Source
Copper (ppm)	0	1.3 ppm	0.24 ppm	30	1	0.02 ppm to 2.10 ppm	No	Corrosion of household plumbing systems
Lead (ppb)	0	15 ppb	5 ppb	30	0	<2.0 ppb to 13 ppb	No	Corrosion of household plumbing systems
Results are from 2019 testing. Next Pb and Cu monitoring is scheduled in 2022.								
Substance (units)	MCLG	MCL	Average	Range Low to High	Violation	Source		
Fluoride (ppm) Results from distribution.	4.0 ppm	4.0 ppm	0.56 ppm	0.40 ppm to 0.70 ppm	No	Added to the drinking water to promote dental health; erosion of natural deposits; discharge from fertilizer and aluminum factories.		
Chlorine (ppm) Results from distribution system.	MRDLG = 4 ppm	MRDL= 4.0 ppm	2.12 ppm	0.20 ppm to 3.50 ppm	No	Added to drinking water as a disinfectant.		
Nitrate-Nitrite (ppm) Sample from entry point.	MCLG	10	One test below detection level	N/A	No	Leaching from septic tanks, fertilizer, erosion of natural deposits.		
During the 2017 - 2019 monitoring period, we did not monitor or test for Metals and therefore cannot be sure of the quality of our drinking water during that time. We will collect the missed samples during the 2020 - 2022 monitoring period.								
Radiological (pCi/L)	MCLG	MCL	Average	Range Low to High **	When Tested	Violation	Source	
Gross Beta	0	50 pCi/L *	NA	One test <1.2 Pci/L Below minimum detectable level.	2019	No	Erosion of natural deposits.	
Radium 228	0	5 pCi/L	NA	One test <0.7 Pci/L Below minimum detectable level.	2019	No	Erosion of natural deposits.	
Gross Alpha	0	15 pCi/L	NA	One test <0.5 Pci/L Below minimum detectable level.	2019	No	Erosion of natural deposits.	
* EPA considers 50 pCi/l to be the level of concern. ** Test results from 2019.								
Disinfection By-Products	MCLG	MCL	Highest Locational Running Annual Average	Range Low to High	Violation	Source		
Trihalomethane THM (ppb)	0	80 ppb	83 ppb	19 ppb to 92 ppb	YES	By-product of drinking water disinfection.		
Haloacetic Acids Group HAA5 (ppb)	0	60 ppb	59 ppb	15 ppb to 47 ppb	No	By-product of drinking water disinfection.		
The locational running annual average of Total Trihalomethanes (TTHM) calculated for 2019 first quarter (average of 2018 second quarter, third quarter, fourth quarter and 2019 first quarter data) from "2700 Block Tank" location was 0.083 mg/L and exceeded the Primary Maximum Contaminant Level (MCL) of 0.080 mg/L. Similarly, the locational running annual average of TTHM calculated for 2019 second quarter (average of 2018 third quarter, fourth quarter, 2019 first quarter and second quarter data) from "Wastewater Plant Administration Building" location was 0.083 mg/L and exceeded the Primary Maximum Contaminant Level (MCL) of 0.080 mg/L. However, during the 2019 third quarter and fourth quarter monitoring, none of annual running averages from all required disinfection byproducts samples exceeded Total Trihalomethanes (TTHM) MCL (0.080 mg/L) and Halo acetic Acids (HAA5) MCL (0.060 mg/L).								
Total Organic Carbons (TOC)	MCLG	MCL	Annual Average	Range Low to High	Violation	Source		
Treatment Technique (TT)	N/A	TT	1.43	0.90 to 2.30	YES	Naturally present in environment		
We failed to collect a monthly TOC sample from finished water (along with a TOC sample and an alkalinity sample from source water) in October 2019 causing a violation, consumers do not need to take any action. Total Organic Carbon has no health effects. However, it is a precursor for the formation of disinfection byproducts. These byproducts include trihalomethanes and haloacetic acids. Compliance with the treatment technique reduces the formation of these disinfection byproducts.								
Treatment Technique (TT) Compliance with treatment technique is a removal ratio of 1.0 and higher. The ratio of removal is the actual Total Organic Carbon removed between the source water and treated water.								
Turbidity (NTU)	MCLG	MCL	Annual Average	Range Low to High	Highest single measurement	Month with lowest average	Source	
Nephelometric (NTU)	N/A	TT	0.05	0.03 to 0.28	0.28	May-99%	Soil runoff.	
Turbidity levels are measured 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 0.3 NTU in at least 95 percent of the monthly measurements, and shall at no time exceed 1 NTU.								
Secondary Regulated Contaminants								
Secondary Contaminants (units)	PMCL	SMCL	Results	Violation	Source			
Chloride (ppm)	N/A	250 ppm	One test 6.5 ppm	No	Naturally present in environment			
Sulfate (ppm)	N/A	250 ppm	One test 13 ppm	No	Naturally present in the environment; addition of water treatment substances.			
Total Dissolved Solid (ppm)	N/A	500 ppm	One test 119 ppm	No	Naturally present in environment			
Non Regulated Substance Monitored								
UCMR4 Results								
Non Regulated Contaminants (units)	MCLG	MCL	Results		Violation	Source		
Samples from Distribution System			Average	Range				
Haloacetic Acids Group HAA5 (ppb)	0	60ppb	59 ppb	21 ppb to 98 ppb	NA	By-product of drinking water disinfection.		
Manganese	NA	NA	0.83 ppb	0.820 ppb - 842 ppb	NA	Naturally present in the environment, also found in many foods.		
Quinoline	NA	NA	0.03 ppb	0.0270 ppb - 0.0289 ppb	NA	Emissions from petroleum refining, coal mining, quenching and coking, and release in shale oil.		
Unregulated contaminant monitoring helps EPA to determine where certain contaminants occur and whether it needs to regulate those contaminants.								
Key to acronyms and abbreviations.								
Non-Detects ND	Laboratory analysis indicates that the constituent is below the detection level.							
Parts per million, (ppm) & Milligrams per liter (mg/L)	Parts per million and milligrams per liter are the same. One part per million corresponds to one minute in two years, or a penny in \$10,000.							
Parts per billion (ppb) & Micrograms per liter (µg/L)	Parts per billion and Micrograms per liter are the same. One part per billion corresponds to one minute in 2000 years, or a penny in \$10,000,000.							
Picocuries per liter (pCi/l)	Picocuries per liter is a measure of the radioactivity in the water.							
Nephelometric Turbidity Unit (NTU) measurement	Nephelometric turbidity unit is a measure of the clarity of water. Turbidity in excess of 5 NTU is just visibly cloudy with the naked eye.							
Action Level (AL)	Concentration of a contaminant which, if exceeded, triggers treatment or other requirements a water system must follow.							
Treatment Techniques (TT)	A treatment technique is a required process intended to reduce level of contaminant in drinking water							
Maximum Contaminant Level (MCL)	The highest level of a contaminate that is allowed in drinking water. MCL's are set as close to the MCLG's as feasible using the best available treatment technology							
Maximum Contaminant Level Goal (MCLG)	The "Goal" (MCLG) is the level of a contaminant in drinking water below which there is no known or expected risk to MCLG's allow for a margin of safety.							
Maximum Residual Disinfection Level (MRDL)	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfection is necessary for control of microbial contaminants.							
Maximum Residual Disinfection Level Goal (MRDLG)	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLG does not reflect the benefits of the use of disinfectants.							
No Regulatory Limit NRL	A substance or chemical constituent that is of interest but currently does not have a regulatory limit or concentration.							

**NOTICE TO CONSUMERS OF THE
MARINE CORPS BASE (MCB) QUANTICO
MAINSIDE WATER SYSTEM**

Missed Test For Metals During The Monitoring Period

In keeping with National Primary Drinking Water Regulations, we are obliged to inform you that we may be in violation of state regulations.

We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not our drinking water meets health standards. During the 2017 - 2019 monitoring period, we did not monitor or test for Metals and therefore cannot be sure of the quality of our drinking water during that time.

There is nothing you need to do at this time. We will collect the missed samples during the 2020 - 2022 monitoring period.

We are attempting to prevent further violations by ensuring that all required sampling in our distribution system is done in accordance with the state drinking water regulations. Future violations will be reported as required by state regulations in order to increase consumers' awareness of conditions that exist in their public water system.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

For more information concerning our drinking water, visit <http://www.quantico.marines.mil/Water-Quality/>, or please contact Mr. Hunho Kim, MCBQ Public Works Water Commodities Manager at 703-432-2466, or CDR Angelique McBee, MCBQ Public Works Officer, at 703-784-5409.

**NOTICE TO CONSUMERS OF THE
MARINE CORPS BASE (MCB) QUANTICO
MAINSIDE WATER SYSTEM**

Missed Monthly Tests For TOC and Alkalinity During October 2019

Our water system recently violated a drinking water requirement. Even though this was not an emergency, as our customers, you have a right to know what happened and what we are doing (did) to correct these situations.

We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not our drinking water meets health standards. During October 2019 we did not monitor or test for Total Organic Carbon (TOC) from both source water and treated water, and also alkalinity from source water (i.e, disinfection byproduct precursors) and therefore cannot be sure of the quality of our drinking water during that time. Disinfection byproduct precursors do not represent a health risk, but are monitored because they provide an indication of treatment efficiency to reduce formation of disinfection byproducts, like total trihalomethanes (THMs) and haloacetic acids (HAAs).

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