

## HEALTH PRECAUTIONS

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as cancer patients 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 about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline at 1-800-426-4791.

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. The U.S. Navy Water System is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using 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 Safe Drinking Water Hotline or at <http://www.epa.gov/safewater/lead>.

## HOW CAN YOU OBTAIN ADDITIONAL INFORMATION?

Please contact Naval Hospital Preventative Medicine at (671) 344-9787 for health concerns related to this report. For information about the U.S. Navy Water System, please contact the Naval Facilities Engineering Systems Command Marianas Utilities Department at (671) 333-1321. Additionally, Guam EPA Safe Drinking Water Program may be reached at (671) 300-9026.

## HOW CAN YOU REPORT A WATER QUALITY COMPLAINT?

Should you notice that your water is discolored, or if you have any concerns about your drinking water, you are encouraged to call our Regional Call Center Marianas Trouble Desk at (671) 333-2011. Arrangements can be made to have your water sampled and analyzed to ensure that it is safe to drink.

Corrective action plans were approved by Guam EPA and an extension agreement was granted to address all deficiencies by September 30, 2023.

- Inadequate number of Level IV treatment plant certified operators.
- Replacement of rusted steel cage and ladder at Maanot Reservoir Building 381 NM.

Guam is required to report outstanding deficiencies that have not been corrected from the last sanitary survey before the next water quality report distribution. Naval Base Guam has been working to address the following:

A sanitary survey was conducted by Guam EPA in January 2022. Per the US EPA Ground Water Rule, Naval Base Guam is required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. All drinking water samples from the U.S. Navy Water System met all primary water Maximum Contaminant Levels (MCL) and Treatment Techniques (TT) requirements in 2022. We also submitted all of our laboratory reports on time as required by Guam EPA.

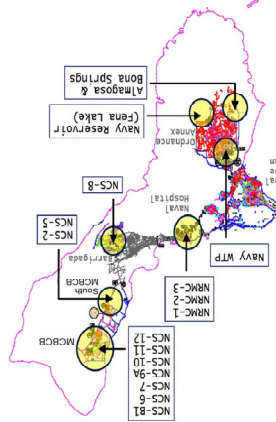
## MONITORING, REPORTING, AND VIOLATIONS

- **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 discharge, 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.
- **Radioactive contaminants**, which can be naturally occurring or be the result of oil and gas production and mining activities.
- **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.

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 can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in untreated water include:

Drinking water, including bottled water, may reasonably be expected to contain small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling Environmental Protection Agency's (EPA) Safe Drinking Water Hotline at 1-800-426-4791.

The primary source of water for the U.S. Navy Water System is the Navy (Fena) Reservoir. It is supplemented by Almagosa Springs and Bona Springs, and is processed at the Navy Water Treatment Plant prior to distribution to Naval Base Guam and surrounding areas. Groundwater wells at Marine Corps Base Camp Blaz, Naval Computer Telecommunication Station (NCTS) Barrigada, and Naval Hospital further augment our water system supplying these areas and supplementing the surface water-fed areas. U.S. Navy Water System Wells NCS 2, NCS 5, NCS B1, NCS 6, NCS 7, NCS 9A, NCS 10, NCS 11, and NCS 12 are now under Marine Corps Base Camp Blaz real property jurisdiction.



## U.S. NAVY WATER SYSTEM

DEPARTMENT OF THE NAVY  
U.S. Naval Base Guam  
Navy Housing Office  
PSC 455, Box 50  
FPO AP 96540-0051

# 2022 U.S. NAVY WATER SYSTEM WATER QUALITY REPORT PWS ID: GU0000010



NAVAL FACILITIES ENGINEERING  
SYSTEMS COMMAND MARIANAS  
PSC 455 BOX 195

The National Primary Drinking Water Regulations sets limits for contaminants in drinking water and standards for water treatment that primarily safeguard health. The Secondary Drinking Water Standards (Aesthetic) are non-enforceable guidelines for limiting the contaminants in drinking water that affect its aesthetic quality (such as taste, smell, appearance, staining properties, etc.). Our drinking water may at times contain various aesthetic parameters above the recommended acceptable levels. While these parameters directly affect the aesthetic quality of your drinking water, they do not pose a health hazard.

In order to ensure that tap water is safe to drink, the EPA created regulations that 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 that must provide the same protection for public health.



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 or businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This annual report contains information about the quality of the water supplied by the U.S. Navy Water System during the period of January 1 to December 31, 2022. Included as part of this report is the "2022 U.S. Navy Water Quality Data" table detailing the water quality of our system. This report will help you, our customer, understand the relationship between the contaminants found in drinking water, activities that may contaminate the water supply, and their associated health effects.

2022 US NAVY WATER SYSTEM  
WATER QUALITY REPORT



# 2022 U.S. NAVY WATER SYSTEM Water Quality Data

The table below presents the 2022 water quality monitoring results of each detected contaminant in comparison with the established drinking water standards. The table also summarizes the monitoring times, the range of detections, whether or not the drinking water standards were met, the major sources of the contaminant, and the locations detected. Monitoring for some contaminants may occur at intervals greater than once per year. This is allowed because the concentrations of these contaminants do not change frequently. Some data, though representative, are more than a year old. For those contaminants, the date of the last sample is shown in the table.

## DEFINITIONS:

1. Action Level (AL) - The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
2. 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.
3. 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.
4. Maximum Residual Disinfectant Level (MRDL) - The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
5. Maximum Residual Disinfectant Level Goal (MRDLG) - The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
6. Treatment Technique (TT) - A required process intended to reduce the level of a contaminant in drinking water.

<b>ABBREVIATIONS:</b>	ARA - annual running average IOC - Inorganic Compound MRL - Minimum Reporting Level NTU - Nephelometric Turbidity Unit	NCS - Naval Communication Station NCTS - Naval Computer and Telecommunication Station NRMC - Navy Regional Medical Center NWTP - Navy Water Treatment Plant	SOC - Synthetic Organic Compound n/a - not applicable nd - not detected (above laboratory detection limit) pCi/L - picoCuries per liter	ppb - parts per billion (or micrograms per liter) ppm - parts per million (or milligrams per liter) ppt - parts per trillion (or nanograms per liter)
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## PRIMARY STANDARDS, Mandatory, Health Related Standards, established by GUAM EPA and US EPA

Contaminants (Units)	Sample Year	MCLG	MCL	Detection Range low	high	Violation	Sources of Contamination	Locations Detected
<b>SYNTHETIC ORGANIC COMPOUNDS</b>								
Picloram (ppb)	2022	500	500	nd	0.27	No	Herbicide runoff	Well NCS 8
<b>INORGANIC CHEMICALS</b>								
Barium (ppm)	2022	2	2	nd	0.0023	No	Discharge from petroleum; erosion of natural deposits; discharge from mines	NWTP Clearwell
Chromium (ppb)	2022	100	100	nd	6.2	No	Discharge of steel and pulp mills; erosion of natural deposits	Wells NCS B1, NCS 6, NCS 9A
Fluoride (ppm)	2022	4	4	nd	1.1	No	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories	NWTP Clearwell
Nickel (ppm)	2022	n/a	n/a	nd	0.001	No	Discharge from domestic wastewater, landfills and mining and smelting operations	Wells NCS B1, NCS 6, NCS 8, NCS 9A, NCS 10, NCS 12
Nitrate (ppm)	2022	10	10	0.14	2.4	No	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	NWTP Clearwell, Wells NCS B1, NCS 6, NCS 8, NCS 9A, NCS 10, NCS 12
<b>RADIONUCLIDES</b>								
Gross Alpha Activity (pCi/L)	2017	0	15	nd	6.4	No	Erosion of natural deposits	Wells NCS 10, NRMC 2
Radium 226 (pCi/L)	2017	0 Note 1	5 Note 1	nd	2.3	No	Erosion of natural deposits	Wells NCS B1, NCS 6, NCS 9A, NCS 10, NCS 11, NCS 12
<b>SPECIAL MONITORING for SODIUM</b>								
Sodium (ppm)	2022	n/a	n/a	13	62	No	Salt water intrusion from aquifer/salt water interface; sodium hydroxide reaction for pH control in water treatment	NWTP Clearwell, Wells NCS B1, NCS 6, NCS 8, NCS 9A, NCS 10, NCS 12
<b>DISINFECTION BY PRODUCTS AND DISINFECTANT RESIDUALS</b>								
Five Haloacetic Acids [HAA5] (ppb)	2022	n/a Note 2	60	12	25	No	Byproduct of drinking water chlorination	Distribution system
Total Trihalomethanes [TTHM] (ppb)	2022	n/a Note 2	80	24	55	No	Byproduct of drinking water chlorination	Distribution system
Control of DBP Precursors [Total Organic Carbon, TOC]	2022	n/a	TT>1.0 Note 3	0.67	6.67	No	Naturally present in the environment	Navy Water Treatment Plant
Chlorine (ppm)	2022	4 (MRDLG)	4 (MRDL)	nd	3.6	No	Water additive used to control microbes	Distribution system, NWTP Clearwell
Contaminants (Units)	Sample Year	AL	MCL	YOUR WATER	Number of samples exceeding AL	Violation	Sources of Contamination	Locations Detected
<b>LEAD and COPPER</b>								
Lead (ppb)	2021	15 Note 4	0	1.6	None	No	Corrosion of household plumbing system, erosion of natural deposits	Distribution system
Copper (ppm)	2021	1.3 Note 4	1.3	0.30	None	No	Corrosion of household plumbing system, erosion of natural deposits	Distribution system
Contaminants (Units)	Sample Year	MCLG	MCL	YOUR WATER	Violation	Sources of Contamination	Locations Detected	
<b>Turbidity as an Indicator of Filtration Performance</b>								
Turbidity (NTU)	2022	n/a	TT ≤ 0.3 NTU for 95% of samples Note 5	100%	No	Soil runoff	Navy Water Treatment Plant	
	6/7/2022	n/a	TT = 1 NTU Note 6	0.182	No	Soil runoff	Navy Water Treatment Plant	
Contaminants (Units)	Sample Year	MCLG	MCL	YOUR WATER	Violation	Sources of Contamination	Locations Detected	
<b>ACRYLAMIDE</b>								
Acrylamide (ppm)	2022	0	Note 7	TT ≤ 0.05% dosed at 1 ppm	No	Added to water during treatment	Navy Water Treatment Plant	

## NOTES:

- All contaminants detected as ND were detected below the established regulatory method detection limit.
- Note 1: The combined radium (total of radium-226 and radium-228, pCi/L) MCL and MCLG are 5 and 0 respectively.
- Note 2: Although there is no collective MCLG for these contaminants, individual MCLGs for some of the contaminants do exist. **HAAs:** Monochloroacetic acid (70 ppb), Dichloroacetic acid (zero), and Trichloroacetic acid (20 ppb). Bromoacetic acid and Dibromoacetic acid do not have MCLGs. **THM:** Bromodichloromethane (zero), Bromoform (zero), Chloroform (70 ppb), Dibromochloromethane (60 ppb). Compliance with MCL is based on LRAA calculated quarterly (highest reported average).
- Note 3: TOC results are calculated quarterly, as the % removal ratio 12-month ARA. The value must be >1.0
- Note 4: The AL is exceeded if the concentration of more than 10 percent of tap water sample collected (the "90th percentile" level) is greater than 1.3 ppm for copper and 15 ppb for lead.
- Note 5: TT = At least 95% of monthly filtered water samples must be <0.3 NTU, measured every four hours. Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of the effectiveness of our filtration system.
- Note 6: TT = No filtered water sample should exceed 1 NTU.
- Note 7: TT ≤ 0.05% dosed at 1 ppm. The combination (or product) of dose and monomer level of acrylamide should never exceed 0.05% dosed at 1 ppm (or equivalent).

## SPECIAL MONITORING FOR PER-AND POLYFLUOROALKYL SUBSTANCES (PFAS)

### What are per-and polyfluoroalkyl substances and where do they come from?

Per- and polyfluoroalkyl substances (PFAS) are a group of thousands of man-made chemicals. PFAS have been used in a variety of industries and consumer products around the globe, including in the United States, for decades. Due to their widespread use and environmental persistence, most people in the United States have been exposed to certain PFAS. PFAS have been used to make coatings and products that are used as oil and water repellent for carpets, clothing, paper packaging for food, and cookware. They are also contained in some foams (aqueous film-forming foam or AFFF) used for fighting petroleum fires.

### Is there a federal or Guam regulation for PFAS in drinking water?

There is currently no federal drinking water standard for any PFAS compounds. In May 2016, the U.S. Environmental Protection Agency (EPA) established a lifetime drinking water health advisory (HA) level at 70 parts per trillion (ppt) for individual or combined concentrations of **perfluorooctanoic acid (PFOA)** and **perfluorooctanesulfonic acid (PFOS)**. Both chemicals are types of PFAS. In Guam, there is no PFAS drinking water regulation. The Department of Defense (DoD) issued a policy in 2020 to monitor drinking water for PFAS at all DoD owned and operated water systems at a minimum of every three years. The DoD policy states that if water sampling results confirm that drinking water contains PFOA and PFOS at individual or combined concentrations greater than the 2016 EPA HA level of 70 ppt, water systems would 1) take immediate action to reduce exposure to PFOS or PFOA, to include providing alternative drinking water; and 2) undertake additional sampling to assess the level, scope, and localized source of contamination.

### What about the EPA's 2022 interim Health Advisories or proposed regulations?

EPA issued interim Health Advisories for PFOS and PFOA in 2022. However these newer levels are below quantifiable limits (i.e., below detection levels). EPA is expected to issue a proposed regulation on PFAS drinking water standards for public comment in the next few months. DoD looks forward to the clarity that a nationwide regulatory standard for PFOS and PFOA in drinking water will provide. In anticipation of this EPA drinking water regulation and to account for emerging science that shows potential health effects of PFOS and PFOA at levels lower than 70 ppt, DoD is evaluating its efforts to address PFAS in drinking water, and what actions we can take to be prepared to incorporate this standard, such as reviewing our current data and collecting additional sampling where necessary. DoD remains committed to communicating and engaging with our communities throughout this process.

### Has Naval Base Guam tested its water for PFAS?

Yes, PFAS samples were collected from multiple locations during three separate occasions in 2022. Refer to the summary of PFAS monitoring results in Table 1-1. Based on the sampling results, PFOS and PFOA tested higher than the 2016 EPA HA on three separate occasions in 2022. The results of all PFAS sampled are provided in Table 1-1. Public notification of sampling results were initially provided on August 27, 2020 via letter distributed to all building occupants and the water quality information page located on the Commander, Navy Installation Command (CNIC) website. The 2016 EPA HA is the concentration above which action will be taken to reduce exposure to PFOA and PFOS. In accordance with the DoD policy, alternate water is provided until the drinking water is tested and is consistently below the 2016 EPA HA. Since July 2020, Naval Base Guam has been sampling in accordance with the March 2, 2020 Assistant Secretary of Defense directive to monitor the situation. Periodic updates are available at <https://irm.cnic.navy.mil/>.



**TABLE 1-1. SUMMARY OF PER-AND POLYFLUOROALKYL SUBSTANCES (PFAS) MONITORING RESULTS**

Sample Date	Location	Detected Contaminant	Detected Level (ppt)	Above 2016 HA Level?	Sampling Point Status Update
6/27/22	Well NRMCM 1	Perfluorohexanoic acid (PFHxA)	3.2	n/a	Well NRMCM 1 taken offline since August 2020 and currently not in use. Alternative drinking water source provided.
		Perfluoroheptanoic acid (PFHpA)	1.3*	n/a	
		Perfluorobutanesulfonic acid (PFBS)	3.3	n/a	
		Perfluorohexanesulfonic acid (PFHxS)	25.4	n/a	
		Perfluorooctanoic acid (PFOA)	2.0	No	
		Perfluorooctane sulfonic acid (PFOS)	59		
	Total (PFOA + PFOS)	61			
	Well NRMCM 2	Perfluorohexanoic acid (PFHxA)	9.1	n/a	Well NRMCM 2 taken offline since August 2020 and currently not in use. Alternative drinking water source provided.
		Perfluoroheptanoic acid (PFHpA)	4.7	n/a	
		Perfluorononanoic acid (PFNA)	4.7	n/a	
		Perfluorodecanoic acid (PFDA)	1.1*	n/a	
		Perfluorobutanesulfonic acid (PFBS)	3.3	n/a	
		Perfluorohexanesulfonic acid (PFHxS)	42.8	n/a	
		Perfluorooctanoic acid (PFOA)	8.6	Yes	
Perfluorooctane sulfonic acid (PFOS)	1320				
Total (PFOA + PFOS)	1328.6				
8/18/22	Well NRMCM 1	Perfluorohexanoic acid (PFHxA)	3.5	n/a	Well NRMCM 1 taken offline since August 2020 and currently not in use. Alternative drinking water source provided.
		Perfluoroheptanoic acid (PFHpA)	1.6*	n/a	
		Perfluorobutanesulfonic acid (PFBS)	3.2	n/a	
		Perfluorohexanesulfonic acid	23.5	n/a	
		Perfluorooctanoic acid (PFOA)	2.3	No	
		Perfluorooctane sulfonic acid (PFOS)	63		
	Total (PFOA + PFOS)	65.3			
	Well NRMCM 2	Perfluorohexanoic acid (PFHxA)	17	n/a	Well NRMCM 2 taken offline since August 2020 and currently not in use. Alternative drinking water source provided.
		Perfluoroheptanoic acid (PFHpA)	7.2	n/a	
		Perfluorononanoic acid (PFNA)	7.0	n/a	
		Perfluorodecanoic acid (PFDA)	2.2	n/a	
		Perfluorobutanesulfonic acid (PFBS)	3.3	n/a	
		Perfluorohexanesulfonic acid (PFHxS)	41.5	n/a	
		Perfluorooctanoic acid (PFOA)	11.4	Yes	
Perfluorooctane sulfonic acid (PFOS)	1430				
Total (PFOA + PFOS)	1441.4				
12/15/22	Well NRMCM1	Perfluorohexanoic acid (PFHxA)	3.1	n/a	Well NRMCM 1 taken offline since August 2020 and currently not in use. Alternative drinking water source provided.
		Perfluoroheptanoic acid (PFHpA)	1.3*	n/a	
		Perfluorobutanesulfonic acid (PFBS)	2.8	n/a	
		Perfluorohexanesulfonic acid (PFHxS)	20	n/a	
		Perfluorooctanoic acid (PFOA)	2.0*	No	
		Perfluorooctane sulfonic acid (PFOS)	46		
	Total (PFOA + PFOS)	48			
	Well NRMCM 2	Perfluorohexanoic acid (PFHxA)	13	n/a	Well NRMCM 2 taken offline since August 2020 and currently not in use. Alternative drinking water source provided.
		Perfluoroheptanoic acid (PFHpA)	5.3	n/a	
		Perfluorononanoic acid (PFNA)	4.5	n/a	
		Perfluorodecanoic acid (PFDA)	1.2*	n/a	
		Perfluorobutanesulfonic acid (PFBS)	2.7	n/a	
		Perfluorohexanesulfonic acid (PFHxS)	36	n/a	
		Perfluorooctanoic acid (PFOA)	7.3	Yes	
	Perfluorooctane sulfonic acid (PFOS)	780			
	Total (PFOA + PFOS)	787.3			
	NWTP Clearwell	Perfluorohexanesulfonic acid (PFHxS)	1.5*	n/a	Continuous monitoring.
		Perfluorooctane sulfonic acid (PFOS)	4.4	n/a	
	Well NCS 8	Perfluorohexanoic acid (PFHxA)	0.66*	n/a	Continuous monitoring.
		Perfluorohexanesulfonic acid (PFHxS)	0.73*	n/a	
		Perfluorooctane sulfonic acid (PFOS)	1.1*	n/a	
	Well NCS 9A	Perfluorohexanoic acid (PFHxA)	0.55*	n/a	Continuous monitoring.
		Perfluorobutanesulfonic acid (PFBS)	0.61*	n/a	
		Perfluorohexanesulfonic acid (PFHxS)	1.4*	n/a	
		Perfluorooctane sulfonic acid (PFOS)	0.38*	n/a	
	Well NCS 10	Perfluorohexanoic acid (PFHxA)	0.92*	n/a	Continuous monitoring.
		Perfluorobutanesulfonic acid (PFBS)	0.86*	n/a	
		Perfluorohexanesulfonic acid (PFHxS)	2.5	n/a	
		Perfluorooctanoic acid (PFOA)	0.61*	No	
		Perfluorooctane sulfonic acid (PFOS)	0.74*		
Total (PFOA + PFOS)	1.35				
Well NCS B1	Perfluorohexanoic acid (PFHxA)	0.85*	n/a	Continuous monitoring.	
	Perfluorobutanesulfonic acid (PFBS)	0.84*	n/a		
	Perfluorohexanesulfonic acid (PFHxS)	1.9*	n/a		
	Perfluorooctanoic acid (PFOA)	0.63*	No		
	Perfluorooctane sulfonic acid (PFOS)	0.60*			
Total (PFOA + PFOS)	1.23				

**NOTES**

1. Values with (\*) reported below method reporting limit.
2. U.S. EPA established a lifetime drinking water health advisory (HA) level at 70 parts per trillion for individual or combined concentrations of perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS).