

GWA Issues its Annual 2016 Water Quality Report

This report is designed to inform you about the excellent water GWA delivers to you every day. Our number one goal is to provide you and your family a safe and dependable supply of drinking water. Our employees strive to deliver a quality product and protect the island's precious water resources. To ensure the safety of our water, GWA routinely monitors for components in the drinking water according to Federal and Guam laws, rules and regulations. Water quality samples are collected throughout the island and tested regularly. Samples include untreated and treated water taken at our facilities, sample sites throughout the service areas and at customers' homes. These tests are overseen by various federal and local regulatory agencies. Except where indicated otherwise, this water quality report is based on the results of GWA monitoring for the period of January 1, 2016 to December 31, 2016.

GWA's drinking water sources contain low levels of a variety of chemicals. Some are of natural origin and some are man-made. Lots of chemicals occur naturally in water and some of these can be undesirable, if found in large quantities. Levels of these naturally-occurring chemicals are normally so low that they pose no health problem. Fluoride is one of those naturally-occurring chemicals, only found at really low levels and poses no health problems. However, fluoride is also used as an additive which is believed by some officials to promote cavity resistance in a young person's growing teeth. GWA does not add fluoride to our water systems, but the US Navy Water System (FENA) does by federal regulation.

It's not the presence of a chemical that is important. What is important is the amount of a chemical that is present in the water. For example, some of the heavy metals, such as lead, cadmium and mercury, occur naturally in water, but are present at such a low level that they do not pose a health risk. Treatment becomes necessary when the amount of the contaminant approaches or exceeds the "Maximum Contaminant Level" (MCL), a level of concentration that is considered to put some persons at risk of adverse health effects. When this situation is found, GWA has chosen to discontinue the use of such a source or install and operate treatment facilities to remove the contaminants.

Nature does an excellent job in providing us with abundant drinking water. However, nature needs our active participation in order to maintain its clarity and purity. Use water wisely. Dispose of wastes properly and support recycling. **Protecting our water resources begins with protecting our environment.**

Sources of Our Drinking Water

Our water is derived from several sources including ground, surface and spring water. The island's principal source of potable water comes from our abundant rainfall, most of which becomes groundwater contained in the aquifer beneath the northern half of the island. Groundwater is pumped from this deep underground aquifer into the water distribution system by over 124 wells. Surface sources used by GWA include an intake from the Ugom River and water purchased from FENA. Spring water from Santa Rita Springs is used to supplement the water supply from FENA for the villages of Asan, Piti, Anigua, Agat, Santa Rita and some areas of Barrigada and Mongmong-Toto-Maite.

It has long been recognized that our water sources need protection, and GWA is determined to protect our very high quality water against contamination, not only from percolation and runoff of surface pollution, septic system discharges, water softener and reverse osmosis waste streams but also from salt-water intrusion due to over-pumping of the aquifer. We are working with the Guam Environmental Protection Agency (GEPA) and the Water and Environmental Research Institute, University of Guam (WERI) to determine the vulnerability of our water sources to contamination. Copies of the Guam Water Data Management System reports are available at GEPA and at WERI and on their websites.

Why are there Contaminants in the Water?

Drinking water, including bottled water, may reasonably be expected to contain at least trace amounts of some contaminants of natural origin. The presence of substances dissolved in drinking water does not usually indicate that the drinking water poses a health risk, and many naturally-occurring ingredients are beneficial to human health. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline at **1-800-426-4791** or GEPA's Safe Drinking Water Program at **(671) 475-1660/1**.

In compliance with the Guam Primary Safe Drinking Water Regulations (GPSDWR), our drinking water is monitored for all regulated contaminants and unregulated ingredients as it leaves our drinking water sources. The contaminants measured include:

- **Microbial contaminants**, such as viruses and bacteria, which are native to the tropical soils, or may come from sewage spills, septic systems, agricultural livestock operations or wildlife.
- **Inorganic contaminants**, such as salts and metals, which are naturally occurring, or may result from stormwater runoff, commercial wastewater discharges, or farming.
- **Pesticide and herbicide contaminants**, which may come from a variety of sources such as home and garden use, agriculture and urban stormwater runoff.
- **Organic chemical contaminants**, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, commercial spills, urban stormwater runoff, and septic systems.
- **Radioactive contaminants**, which can be naturally occurring or be the result of improper disposal of radioactive waste.

This report shows ONLY the contaminants that have been detected. If you would like a complete listing of GWA test results, or if you have any questions regarding this report, please call **Carmen Sian-Denton** at our Laboratory Services Division at **(671) 632-9697 or 637-2895** during normal business hours.

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 people, and infants can be particularly at risk from infections. These people should seek advice, about drinking water, from their health care providers. 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 Safe Drinking Water Hotline at 1-800-426-4791.

Is our Water System Meeting other Rules that Govern our Operations?

Disinfection By-Products Regulations: Where disinfection is used in the treatment of drinking water, disinfectants combine with organic and inorganic matter present in water to form chemicals called disinfection byproducts (DBPs). EPA sets standards for controlling the levels of disinfectants and DBPs in drinking water including trihalomethanes (THMs) and haloacetic acids (HAA5s).

We are pleased to report that all of GWA's Distribution Systems are in compliance with the DBP regulations.

Other Information

Stipulated Order for Preliminary Relief and the 2011 Court Order

In December 2002, a civil suit was filed against GWA and the Government of Guam by the United States Department of Justice (DOJ) seeking to address Public Health compliance issues in GWA's wastewater and drinking water systems. In June 2003, Federal DOJ, USEPA, GWA and the Government of Guam negotiated the terms of the Stipulated Order for preliminary Relief; Civil Case No. 02-0035 (SO). With it GWA, under EPA oversight, undertook a broad initiative to restore its facilities and to provide safe, reliable service to the island while meeting all regulations. The compliance issues to be addressed under the SO included drinking water focused construction and rehabilitation projects, and training of GWA personnel. There were reporting requirements and notice provisions incorporated in the SO that were more stringent than normal regulatory reporting. A full scale Water Resources Master Plan was also produced.

USEPA has been satisfied with GWA's progress with the SO mandates and USEPA and Guam EPA concur that GWA's drinking water now meets or exceeds the SDWA and GPSDWR requirements.

On October 10, 2011, the SO was replaced by a District Court Order (CO) which recognizes GWA's progress in providing reliable and safe drinking water and which is focused more on environmental issues and the need to work through the projects identified in the Water Resources Master Plan. GWA is working closely with both USEPA and Guam EPA in order to achieve or exceed the goals of the CO.

A copy of the **"Water Resources Master Plan" and the "Order for Preliminary Relief RE: Deadlines for Projects Under the Amended Stipulated Order, Civil Case No. 02-0035"** are posted on the GWA website at <http://guamwaterworks.org/compliance-and-safety/>. If you need more information on the CO, please call **Paul Kemp**, GWA Assistant General Manager for Compliance and Safety, at **(671) 300-6885**.

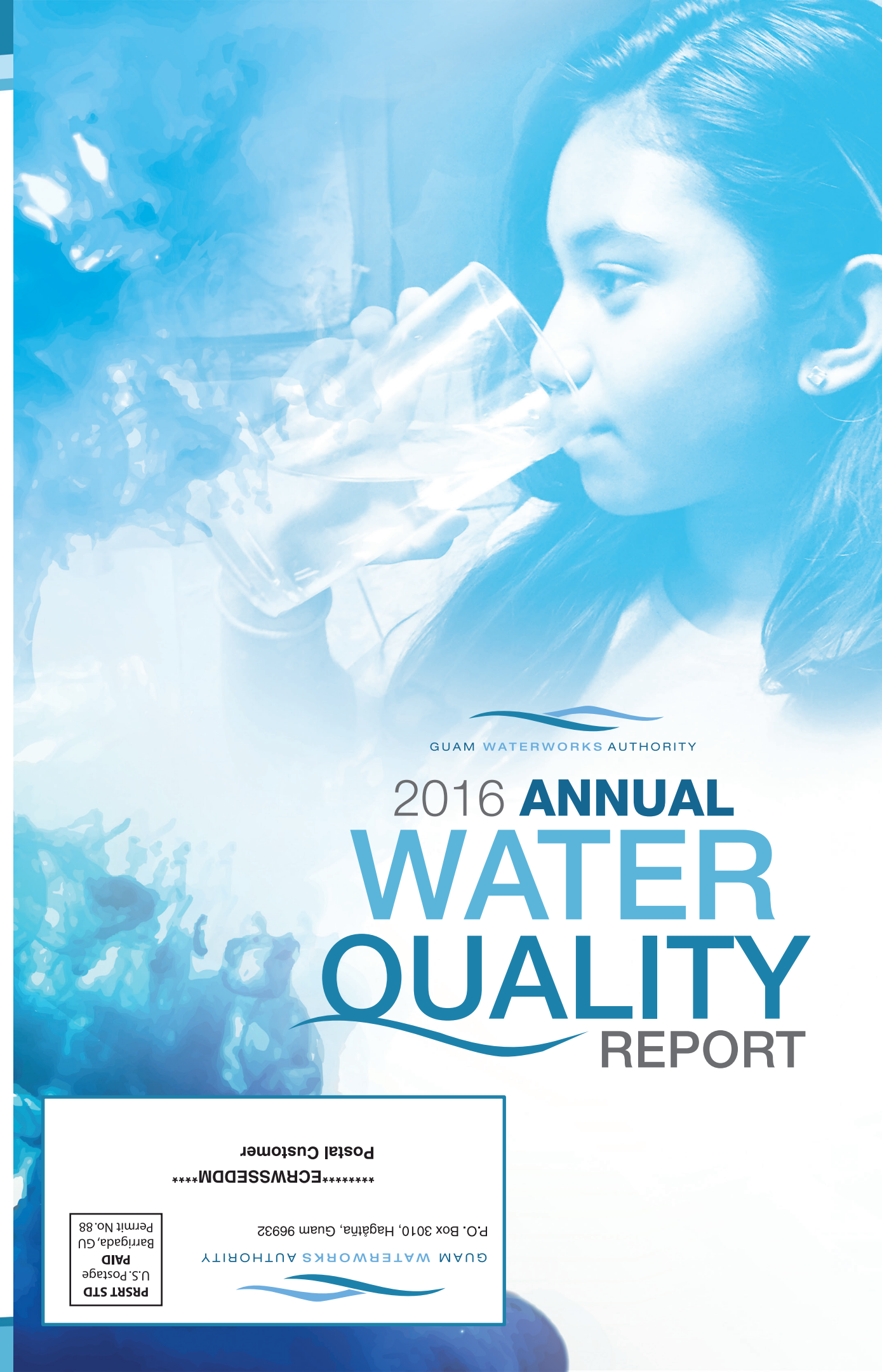
Frequently Asked Questions

What if My Water Tastes, Smells, or Looks Strange?

Certain things can affect the flavor, odor, and appearance of your tap water, not all of them are necessarily harmful. Many people receiving public water can sometimes taste chlorine. The most noticeable problems tend to come from private wells. Contaminants like sulfur can impact the smell and are removed by disinfection with chlorine in public systems. Iron, while not considered a health concern, can cause discoloration and staining. The overall amount of total dissolved solids (TDS) in your tap water will definitely affect the taste. Dissolved air can give the water a temporary white appearance. While these issues are not health concerns, they can be undesirable. Some water filtration systems can remove iron that tends to cause staining.

Is Bottled Water Safer and Cleaner than Tap Water?

You might think the safest bet is to purchase bottled water at the store if you want to avoid contaminants in the water you drink. In the past 10 to 15 years, regulations managing the quality of bottled water have improved it, but bottlers need to back up their claims concerning how their product is marketed. However, bottled water may not be the most cost-effective or environmentally-friendly way to get quality drinking water. In many cases, bottled water is nothing more than tap water that has usually been re-treated. This means you could be wasting your money and creating unnecessary waste by drinking bottled water when other options can give you the same quality in your home.



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2016 ANNUAL WATER QUALITY REPORT

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2016 WATER QUALITY DATA

PRIMARY STANDARDS: Mandatory Health-Related Standards

CONTAMINANT (units)	MCLG	MCL	GROUND WATER		UGUUM WATER		FENA WATER		MAJOR SOURCES OF CONTAMINANT
			RANGE	RV	RANGE	RV	RANGE	RV	
Regulated VOCs Trichloroethylene (TCE) (ppb)	0	5	0 - 0.73	0.73	nd	nd	nd	nd	Discharge from metal degreasing sites
Regulated SOCs Chlordane (ppb) Endrin (ppb)	0 0	2 2	nd - 0.45 nd	0.45 nd	nd nd	nd nd	nd nd	nd nd	Banned termiticide residue Banned insecticide residue
Regulated ICs Antimony (ppb) ¹	6	6	nd - 1.7	1.7	nd	nd	nd	nd	Discharge from petroleum refineries; ceramics; electronics
Arsenic (ppb) ¹ Barium (ppb) ¹ Chromium (ppb) ¹ Fluoride (ppm) ¹ Nitrate-N (ppm)	0 2000 100 4	10 2000 100 4	nd - 4.4 nd - 35 nd - 23.0 nd - 0.2	4.4 35.0 23 0.02	nd nd - 5.6 nd nd - 0.061	nd 5.6 nd 0.06	nd nd - 12.0 nd nd - 0.73	nd 12.0 nd 0.73	Erosion of natural deposits Erosion of natural deposits Erosion of natural deposits Water additive; naturally occurring
Selenium (ppb) ¹	50	50	nd - 11	11.00	nd	nd	nd	nd	Runoff from fertilizer use; leaching from sewage Discharge from petroleum refs; erosion of natural deposits
Radionuclides¹ Radium 226 (pCi/l) Radium 228 (pCi/l) Gross Alpha Activity (pCi/l) Gross Beta Activity (pCi/l)	0 0 0 0	5 5 15 50*	<1.00 <1.00 <3 - 14 <3 - 12	<1.00 <1.00 14.00 12.00	<1.00 <1.00 <3.00 <3.00	<1.00 <1.00 <3.00 <3.00	<1 - 1.4 <1.00 <3.00 <3 - 5.0	1.4 <1.00 <3.00 5.0	Erosion of natural deposits Erosion of natural deposits Erosion of natural deposits Decay of natural and man-made deposits

* The MCL for beta particles is 4 mrem/year. However, EPA considers 50 pCi/l to be the level of concern for beta particles.

Lead and Copper Rule

CONTAMINANT (units)	MCLG	MCL	NORTHERN		CENTRAL		SOUTHERN		MAJOR SOURCES OF CONTAMINANT
			90TH PERCENTILE LEVEL	SAMPLES ABOVE AL	90TH PERCENTILE LEVEL	SAMPLES ABOVE AL	90TH PERCENTILE LEVEL	SAMPLES ABOVE AL	
Copper (ppb) ² Lead (ppb) ²	1300 0	AL=1300 AL=15	160 4.3	0 0	205 2.85	0 0	103.5 1.7	0 0	Corrosion of household plumbing; erosion of natural deposits

Microbial Contaminants²

CONTAMINANT (units)	MCLG	MCL	NORTHERN		CENTRAL		SOUTHERN		MAJOR SOURCES OF CONTAMINANT
			VIOLATION	RV	VIOLATION	RV	VIOLATION	RV	
Total Coliform (TC) Fecal coliform (FC) or E. coli	0 0	5% See Note 1	No No	1.0% 0	No No	0.0% 0	No No	0.0% 0	Naturally present in environment Human and animal fecal waste

Note 1: MCL = a routine sample and a repeat sample are TC positive, and one is also FC or E. coli positive.

Disinfection Byproducts and Disinfection Residuals²

CONTAMINANT (units)	MCLG	MCL	NORTHERN		CENTRAL		SOUTHERN		MAJOR SOURCES OF CONTAMINANT
			VIOLATION	RV	VIOLATION	RV	VIOLATION	RV	
HAA5 (Five Haloacetic Acids (ppb) ² Total Trihalomethanes (ppb) ²	n/a n/a	60 80	No No	2 12.2	No No	19.7 57.3	No No	24.5 54.3	By-product of drinking water chlorination By-product of drinking water chlorination
Chlorine (ppm) ²	4	4	1.3 - 1.5	1.4	0.9 - 1.6	1.4	0.7 - 1.2	1.0	Water additive to control microbes

Turbidity as Indicator of Filtration Performance

CONTAMINANT (units)	MCLG	MCL	UGUUM WATER		FENA WATER		MAJOR SOURCES OF CONTAMINANT
			RV	VIOLATION	RV	VIOLATION	
Turbidity (ntu)	n/a	TT See Note 2	100.0%	No	100%	No	Soil runoff

Note 2: TT = 95 % of samples measured every 4 hours < 0.3 ntu

Unregulated Contaminants (Monitoring Required)**

CONTAMINANT (units)	MCLG	MCL	GROUND WATER		UGUM WATER		FENA WATER	
			RANGE	RV	RANGE	RV	RANGE	RV
Unregulated VOCs Bromodichloromethane (ppb) Bromoform (ppb) Chlorodibromomethane (ppb) Chloroform (ppb)	ns ns ns ns	ns ns ns ns	nd - 4 nd - 11 nd - 7.9 nd - 9.5	4 11 7.9 9.5	nd - 11 nd - 0.94 nd - 4.8 nd - 15	11 0.94 4.8 15	nd - 4.5 nd - 2.8 nd - 3.4 nd - 11	4.5 2.8 3.4 11
Unregulated SOCs Dieldrin (ppb) PFOS (ppb) ^{****}	ns ns	ns ns	nd - 1.5 nd - 0.41	1.5 0.41	nd nd	nd nd	nd nd	nd nd
Unregulated ICs Sulfate (ppm) ¹	ns	250	3.2 - 64	64	nd - 13	13	nd - 15	15

** Unregulated contaminant monitoring helps EPA to determine where certain contaminants occur and whether there is a need to regulate those contaminants.

**** PFOS was discovered in GWA wells and GWA has chosen to remove these sources from the water system until the material ceases to be detected or until GWA is able to provide treatment that will remove/reduce it below the health advisory level of 0.07 ppb. There is no PFOS in GWA water.

Secondary Maximum Contaminant Levels - Consumer Acceptance Limits***

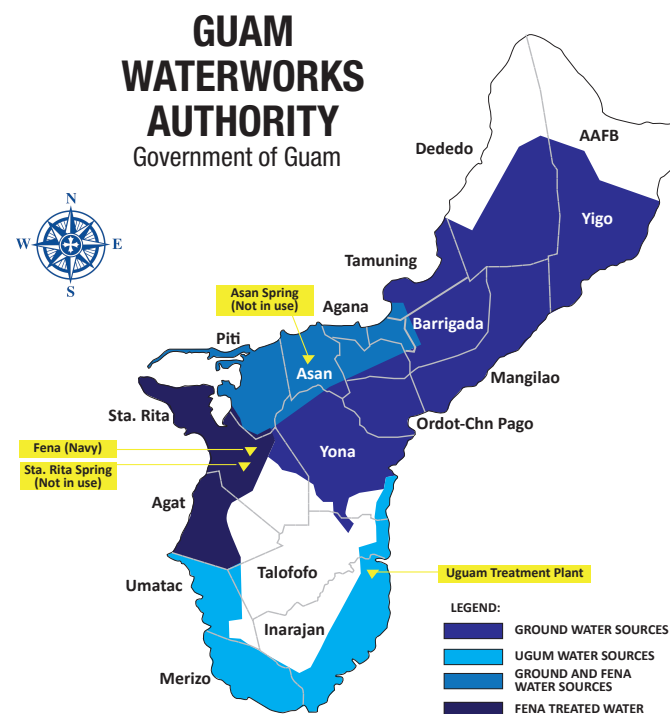
CONTAMINANT (units)	MCLG	MCL	GROUND WATER	UGUM WATER	FENA WATER
			RANGE	RANGE	RANGE
Chloride (ppm) Conductivity (mmho/cm) pH (units)	n/a n/a n/a	250 1600 6.5 - 8.5	19 - 458 282 - 2220 6.76 - 8.04	31 - 46 127 - 238 7.42 - 7.73	29 - 42 224 - 317 7.22 - 7.99

*** Secondary MCL monitoring helps GWA to determine areas in need of adjustment, additional maintenance or rehabilitation in order to provide a high quality water that appeals to the consumer.

Additional Constituents Analyzed

CONTAMINANT (units)	MCLG	MCL	GROUND WATER	UGUM WATER	FENA WATER
			RANGE	RANGE	RANGE
Alkalinity as CaCO3 (ppm) Sodium (ppm) Hardness as CaCO3 (ppm)	n/a n/a n/a	n/a n/a n/a	155 - 393 9.4 - 280 124 - 450	34 - 258 nd - 9.9 24-104	89 - 114 nd - 16 80 - 104

GUAM WATERWORKS AUTHORITY Government of Guam



About the Data

1. Data presented in these tables list the results of tests done between Jan 1 – Dec 31, 2016. Tables list only the contaminants detected. Detection does not necessarily mean a violation or exceedance of an MCL or Treatment Technique. GWA monitors for some constituents less than once per year because they are not expected to vary significantly from year to year. Therefore, some of the water quality data reported, although representative, may be more than one year old. If you have questions about this water quality report, please contact Carmen M. Sian-Denton, GWA's Monitoring Laboratory Services Administrator at (671) 632-9697 or (671) 637-2895.

2. Microbial, lead and copper, haloacetic acid (HAA5), and total trihalomethane (TTHM) samples were taken from the distribution system, not from source waters. Compliance with MCL for HAA5 and TTHM monitoring is based on ARA (annual running average) calculated quarterly. Compliance for chlorine is based on ARA calculated monthly (highest average).

Definitions and Abbreviations

- MCLG:** Maximum Contaminant Level Goal, or 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.
- MCL:** Maximum Contaminant Level, or the highest level of a contaminant allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technique.
- MRDL:** Maximum Residual Disinfectant Level, or the level of a disinfectant that may not be exceeded at the consumer's tap without an unacceptable possibility of health effects.
- MRDLG:** Maximum Residual Disinfectant Level Goal, or the maximum level of a disinfectant added to the water treatment at which no known or anticipated adverse health effect would occur. MRDLGs allow for a margin of safety.
- AL:** Action Level, or the concentration of a contaminant which, when exceeded triggers treatment or other requirements that a water system must follow. Copper AL = 1300 ppb; Lead AL = 15 ppb.
- TT:** Treatment Technique or a required process intended to reduce the level of a contaminant in drinking water.
- RV:** Reporting Value, or that used for determining compliance with the MCL, and is the highest average value for any single source tested. For VOCs and SOCs, RV= the highest annual average. For ICs and radionuclides, RV= the highest value detected. If the RV is below the MCL, the water is meeting the health and safety-based standards.
- Range:** Range of values actually detected in samples from all the water tested.
- VOC:** Volatile Organic Chemical.
- SOC:** Synthetic Organic Chemical.
- IC:** Inorganic Chemical.
- ntu:** nephelometric turbidity units.
- ppm:** parts per million, or milligrams per liter.
- ppb:** parts per billion, or micrograms per liter.
- ppt:** parts per trillion, or nanograms per liter.
- pCi/l:** picocuries per liter, a measure of radioactivity.
- mrem/yr:** millirems per year, a measure of radioactivity.
- nd:** not detectable at testing limits.
- n/a:** not applicable.
- ns:** no standard.

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