# GWA Proudly Introduces the 2011 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 314 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 contaminants 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 customer's 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, 2011 to December 31, 2011.

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 young persons 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 how much of a chemical 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 are not a problem. 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 Ugum River and water purchased from FENA. Spring water from Santa Rita Spring 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, but also salt-water intrusion due to over-pumping of the aquifer and septic system discharges of water softener regeneration salt. 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 web sites.

## 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. 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 and unregulated contaminants 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, 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?

**Lead and Copper Rule:** The corrosion control studies, completed in 1998 and 2002, for lead and copper in the distribution system have shown levels to be in compliance with the Lead and Copper Rule. Island wide sampling for lead and copper is scheduled to begin again. GWA will be working with GEPA to determine the sampling points necessary to complete this task.

## Do You Need to Take Special Precautions?

Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at our faucet may be higher than at other homes in the community as a result of piping and fixtures used in our water plumbing system. If you are concerned about elevated lead levels in your home's water supply, you may wish to have your water tested by a commercial certified laboratory (e.g. WERI). You could also flush your tap for 30 seconds to 2 minutes before using your tap water. Additional information is also available by calling GEPA at **(671) 475-1660/1.**

**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 (DBP's). EPA sets standards for controlling the levels of disinfectants and DBP's in drinking water including trihalomethanes (THM's) and haloacetic acids (HAA5's).

Last year's monitoring of THM's and HAA5's still showed violations in the Annual Running Average for some locations in the Central Distribution System (PWS ID GU0000003) which is served by water purchased from the Navy FENA water treatment plant and supplemented by water from Santa Rita Spring. **Corrective action is still required of the water purveyor (FENA Water Treatment Plant).**

## Do You Need to Take Special Precautions?

Some people who drink water containing THM's in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer. Some people who drink water containing HAA5's in excess of the MCL over many years may have an increased risk of getting cancer. Additional information is also available by calling GEPA at **(671) 475-1660/1.**

## Other Information

## October 10, 2011 Court Order (CO)

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 and EPA, GWA and the Government of Guam negotiated the terms of the Stipulated Order for preliminary Relief; Civil Case No. 02-0035 (SO) by which GWA, under EPA oversight, undertook a broad initiative to upgrade its facilities and to enhance its ability to provide safe, reliable service to the island while meeting all regulations. The SO was amended in 2006 to reflect progress up to that time and to add additional improvements to the drinking water and waste water systems. A Water Resources Master Plan, an upgraded disinfection program, an enhanced disinfection residual level monitoring program, a leak detection and repair program, a water meter improvement program and renovations of GWA's wastewater treatment systems including new deeper ocean outfalls are only some of the projects implemented under the terms of the amended SO. A copy of the 2006 amended Stipulated Order for preliminary Relief; Civil Case No. 02-0035 is posted on the GWA web site: http://www.guamwaterworks.org/. On 11/10/2011, after discussions between GWA, USEPA US Department of Justice and Guam EPA; Judge Tydingco-Gatewood issued a new Court Order again reflecting progress to date and guiding GWA toward further island wide system reliability and improvements. This CO is also posted on the GWA web site: http://www.guamwaterworks.org/.

2011 Annual Water Quality Report

Hunggan! Yes! Our water is safe to drink.

GUAM WATERWORKS AUTHORITY
P.O. Box 3010, Hagåtña, Guam 96910

PRS
U.S. POSTPAGE
PAID
BARRIGADA, GU
PERMIT NO.88

guamwaterworks.org/.

# 2011 WATER QUALITY DATA

**PRIMARY STANDARDS: Mandatory Health-Related Standards**

| CONTAMINANT (units) | MCLG | MCL | GROUND WATER | | UGUM WATER | | FENA WATER | | Major Sources of Contaminant |
|---|---|---|---|---|---|---|---|---|---|
| | | | Range | RV | Range | RV | Range | RV | |
| ***Regulated VOCs*** | | | | | | | | | |
| Carbon Tetrachloride (ppb) | 0 | 5 | nd - 1.45 | 1.45 | nd | nd | nd | nd | Discharge from industrial |
| Tetrachloroethylene (PCE) (ppb) | 0 | 5 | nd - 0.5 | 0.5 | nd | nd | nd | nd | Leaching from PVC pipes, discharge from dry cleaners |
| Trichloroethylene (TCE) (ppb) | 0 | 5 | nd - 1.93 | 1.93 | nd | nd | nd | nd | Discharge from metal degreasing sites |
| ***Regulated SOCs*** | | | | | | | | | |
| Chlordane (ppb) | 0 | 2 | nd - 1.1 | 1.1 | nd | nd | nd | nd | Banned termiticide residue |
| Endrin (ppb) | 0 | 2 | nd - 0.15 | 0.15 | nd | nd | nd | nd | Residue of banned insecticide |
| Heptachlor epoxide (ppt) | 0 | 200 | nd - 0.02 | 0.02 | nd | nd | nd | nd | Banned termiticide residue |
| ***Regulated IOCs*** | | | | | | | | | |
| Arsenic (ppb)[1] | 0 | 10 | nd - 4.0 | 4.0 | nd | nd | nd | nd | Erosion of natural deposits |
| Barium (ppb)[1] | 2000 | 2000 | nd - 13 | 13.0 | 2.6 - 3.5 | 3.5 | 3.0 - 12 | 12.0 | Erosion of natural deposits |
| Chromium (ppb)[1] | 100 | 100 | nd - 34 | 34 | nd | nd | nd - 8.0 | 8.0 | Erosion of natural deposits |
| Fluoride (ppm)[1] | 4 | 4 | nd - 0.15 | 0.02 | nd | nd | 0.65 - 0.75 | 0.75 | Water additive; naturally occuring which promotes strong teeth |
| Nitrate-N (ppm) | 10 | 10 | 0.2 - 4.7 | 4.70 | nd | nd | 0.3 - 2.1 | 2.1 | Runoff from fertilizer use; leaching from sewage |
| Selenium (ppb)[1] | 50 | 50 | nd - 5.7 | 5.70 | nd | nd | nd | nd | Erosion of natural deposits |
| ***Radionuclides*** [1] | | | | | | | | | |
| Radium 228 (pCi/l) | 0 | 5 | <1 - 1.26 | 1.05 | <1.00 | <1.00 | <1.00 | <1.00 | Erosion of natural deposits |
| Gross Alpha Activity (pCi/l) | 0 | 15 | <3 - 4.2 | 3.8 | <3.00 | <3.00 | <3.00 | <3.00 | Erosion of natural deposits |
| Gross Beta Activity (pCi/l) | 0 | 50* | <3.00 | <3.00 | <3.00 | <3.00 | <3.00 | <3.00 | 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.

**Microbial Contaminants**[2]

| CONTAMINANT (units) | MCLG | MCL | NORTHERN | | CENTRAL | | SOUTHERN | | Major Sources of Contaminant |
|---|---|---|---|---|---|---|---|---|---|
| | | | Violation | RV | Violation | RV | Violation | RV | |
| Total Coliform (TC) (% positive/month) | 0 | 5 % | No | 0.5% | No | 2.4% | No | 0.0% | Naturally present in environment |
| Fecal coliform (FC) or *E. coli* | 0 | See Note 1 | No | 0 | No | 0 | No | 0 | 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 Residuals**[2]

| CONTAMINANT (units) | MCLG | MCL | NORTHERN | | CENTRAL | | SOUTHERN | | Major Sources of Contaminant |
|---|---|---|---|---|---|---|---|---|---|
| | | | Violation | RV | Violation | RV | Violation | RV | |
| HAA5 (Five Haloacetic Acids) (ppb)[2] | n/a | 60 | No | 9.4 | Yes | 68.0 | No | 56.5 | By-product of drinking water chlorination |
| Total Trihalomethanes (ppb)[2] | n/a | 80 | No | 52.3 | Yes | 145 | No | 72.0 | By-product of drinking water chlorination |
| Chlorine (ppm)[2] | MRDLG | MRDL | | | | | | | Water additive to control microbes |
| | 4 | 4 | 1.1 - 1.3 | 1.2 | 1.0 - 1.2 | 1.1 | 0.7 - 1.4 | 1.0 | |

**Turbidity as Indicator of Filtration Performance**

| CONTAMINANT (units) | MCLG | MCL | UGUM WATER | | FENA WATER | | Major Sources of Contaminant |
|---|---|---|---|---|---|---|---|
| | | | RV | Violation | RV | Violation | |
| Turbidity (ntu) | n/a | TT See Note 2 | 99.8% | 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) | ns | ns | nd - 0.61 | 2.7 | nd | nd | nd - 8.6 | 8.6 |
| Bromoform (ppb) | ns | ns | nd | nd | nd | nd | nd - 1.9 | 1.9 |
| Chlorodibromomethane (ppb) | ns | ns | nd | nd | nd | nd | nd - 5.2 | 5.2 |
| Chloroform (ppb) | ns | ns | nd - 9.7 | 9.7 | nd | nd | nd - 28 | 28 |
| ***Unregulated SOCs*** | | | | | | | | |
| Dieldrin (ppb) | ns | ns | nd - 1.2 | 1.2 | nd | nd | nd | nd |
| ***Unregulated IOCs*** | | | | | | | | |
| Sulfate (ppm)[1] | ns | 250 | 1.5 - 13 | 13 | 15 | 15 | nd - 26 | 26 |

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

**Secondary Maximum Contaminant Levels - Consumer Acceptance Limits*****

| CONTAMINANT (units) | MCLG | MCL | GROUND WATER | UGUM WATER | FENA WATER |
|---|---|---|---|---|---|
| | | | Range | Range | Range |
| Chloride (ppm) | n/a | 250 | 20 - 791 | 22 - 53 | 25 - 65 |
| Copper (ppb)[1] | n/a | 1000 | 2.0 - 150 | nd - 17 | nd - 12 |
| Conductivity (µmho/cm) | n/a | 1600 | 274 - 2140 | 84 - 135 | 184 - 293 |
| pH (units) | n/a | 6.5 - 8.5 | 7.02 - 7.83 | 7.15 - 7.39 | 7.32 - 7.83 |

*** 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 $CaCO_3$ (ppm) | n/a | n/a | 145 - 412 | 28 - 66 | 77 - 111 |
| Sodium (ppm) | n/a | n/a | 1.2 - 370 | 9.3 - 9.9 | 7.0 - 16 |
| Hardness as $CaCO_3$ (ppm) | n/a | n/a | 156 - 600 | 46 - 68 | 1 2 - 124 |

**About the Data:**

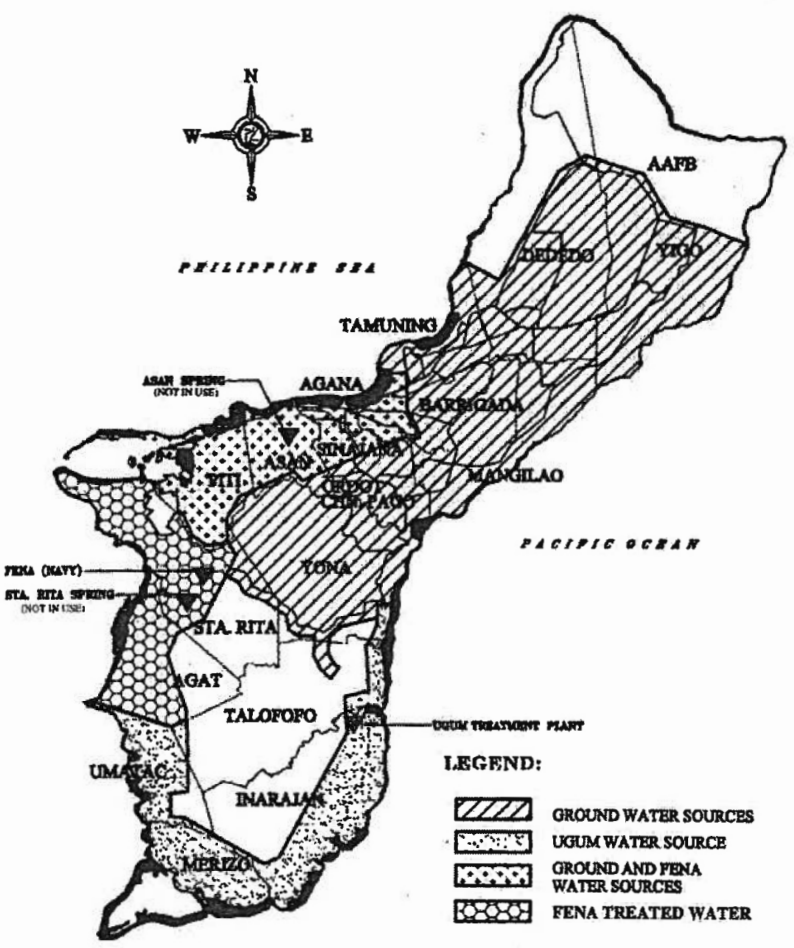
1. Data presented in these tables list the results of tests done between Jan 1 – Dec 31, 2011. Tables list only the contaminants detected. Detection does not necessarily mean a violation or exceedence of an MCL or Treatment Technique. GWA monitors for some constituents less than once per year because 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 632-9697 or 637-2895.

2. Microbial, 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 as 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 IOCs 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
- **IOC:** 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

**GUAM WATERWORKS AUTHORITY**
**GOVERNMENT OF GUAM**




**ISLAND OF GUAM WATER DISTRIBUTION**