



# Drinking Water Quality Annual Report for Calendar Year 2023



## Gwangju Air Base (Published: June 2024)

This annual report summarizes the quality of water delivered by Gwangju Air Base (AB). Under the "Consumer Confidence Reporting Rule" of the federal Safe Drinking Water Act (SDWA) and Overseas Environmental Baseline Guidance Document, community water systems are required to report this water quality information to the consuming public. Presented in this report is information on the source of our water, its constituents, and the health risks associated with any contaminants. The goal of any water system is to provide the public with a safe and dependable supply of drinking water.

**“This report contains important information regarding your drinking water. Therefore, please have someone who can understand this report translate it for you. Please call Bioenvironmental Engineering at DSN: 315-782-6541 if you have any question regarding this report.”**

“이 보고서에는 귀하의 식수에 대한 중요한 내용이 실려있습니다. 그러므로 이 보고서를 이해할 수 있는 사람한테 번역해 달라고 부탁하시기 바랍니다. 보고서에 대한 질문은 생물환경공학과 315-782-6541 로 문의하시기 바랍니다.”

## 1. Drinking Water Sources for Gwangju Air Base

The primary water source for Gwangju AB is the Hwang Yong River. This river supplies Juam Reservoir, which feeds the Duknam Water Treatment Plant (WTP). The water undergoes flocculation, settling, filtration, granulated activated carbon (GAC) filtration, and chlorination at the Duknam WTP. This water then enters another water treatment plant on Gwangju AB that performs disinfection of the water by chlorine addition prior to distribution to the base. For more information on these water sources, please contact the Bioenvironmental Engineering (BE) Flight (8 OMRS/SGXB) at DSN 315-782-6541.

## 2. Common Sources of Drinking Water Contamination

Common sources of drinking water (both tap 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, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or human activity. Contaminants that may be present in source or untreated 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 agriculture, urban storm water runoff, and residential uses.
- **Organic chemical contaminants**, including synthetic and volatile organics, which are by-products of industrial processes and petroleum production, and can come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive Contaminants**, which can be naturally occurring or the result of oil/gas production and mining activities.

Drinking water, including bottled 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 Environmental Protection Agency's (EPA) Safe

Drinking Water Hotline (1-800-426-4791). The EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems in order to ensure that tap water is safe to drink. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water that must provide the same protection for public health.

### 3. Water Safety and Quality Assurance Responsibilities

Republic of Korea Air Force (ROKAF) and US Forces Korea (USFK) share the management and maintenance of the primary drinking water supply and distribution system at Gwangju AB. Water utility personnel from the 607 Material Maintenance Squadron Civil Engineering Office (607 MMS/CE) operate on 24-hour shifts to ensure the system is pressurized and that disinfectant levels are adequate at all times. The BE Flight monitors the quality of the drinking water provided to consumers and addresses any health-related concerns. Analysis is conducted by certified laboratories for all contaminants. Additionally, BE personnel analyze water samples for microbial contaminants monthly.

Department of Air Force Instruction 48-144 requires the Drinking Water Working Group (DWWG) to meet semi-annually and include representation from the Water and Fuels Systems Maintenance Flight, Civil Engineering Environmental Element, and BE. The DWWG meets to address all local drinking water issues involving compliance, risk reduction, and continuous improvement. The DWWG has the authority to call a special meeting with Public Affairs (PA), Base Legal (JA), or other related members as needed. Consumers are welcome to attend this meeting; please call 315-782-6541 for schedule information.

### 4. Drinking Water Monitoring

Kunsan AB BE Flight routinely monitors for over 80 contaminants using certified laboratories and approved methods in accordance with the 2020 Korean Environmental Governing Standards (KEGS) and EPA regulations. A breakdown of the categories of contaminants we monitor is as follows:

- **Microbial contaminants:** Sampling is conducted monthly at distribution points such as the fire department, dining facility, BX and various other administrative and industrial work centers on base to include analysis for the levels of chlorine in the water. During 2023, a total of 60 microbiological samples were taken with NO samples testing positive for contaminants.
- **Inorganic compounds:** This list is in KEGS Chapter 3, Page 41, Table 3-4
- **Volatile organic compounds:** This list can be found in KEGS Chapter 3, Pg. 44, Table 3-7.
- **Synthetic volatile organic compounds:** This list can be found in KEGS Chapter 3, Pg. 47, Table 3-8. This includes pesticides and insecticides which are administered by Installation Pest Management.
- **Disinfection By-Products:** These contaminants form in water from the reaction of chlorine with chemicals in the water. Chapter 3 of the KEGS, page 48, Table 3-9.
- **Lead and Copper:** Lead and copper are present in older sections of the water distribution system. See Chapter 3, Page 42-43, Table 3-6 of the KEGS.
- **Radiological Compounds:** See Chapter 3, Page 51, Table 3-10 of the KEGS.
- **PFOS/PFOA:** Monitoring requirements are based on DoD Policy.

**Table 1. Contaminant Groups and Monitoring Frequencies as of 2022**

Contaminant	Chemical Name	Monitoring Frequency	Sampling Location
Microbial	Total coliform, Fecal coliform, pH, Free Available Chlorine	Monthly	Entry Point Building 2106 BX Food-court
Inorganic Compounds	Metals such as selenium, arsenic, mercury, nickel, sodium, etc.	Annually	Entry Point
	Nitrate, Nitrite	Annually	
	Asbestos	Once every 9 years	
Volatile Organic Compounds (VOC)	Benzene, Trichloroethylene, Carbon Tetrachloride, etc.	Annually	Entry Point
Synthetic Volatile Organic Compounds (SVOC)	Pesticides, Herbicides, PCBs, etc.	Annually	Entry Point
Disinfection By-Products	Total Trihalomethanes (TTHM) Total Haloacetic Acids (HAA5)	Annually	Entry Point
Lead & Copper	Lead, Copper	Semi-annually	7 locations inside Gwangju AB
Radiological Compounds	Gross Alpha and Beta, Radium 226 Uranium 228	Every 4 years (all 4 quarters)	Entry Point
PFAS Compounds	Per- and polyfluoroalkyl substances (PFAS) (29 compounds)	Every 2 years	Entry Point

## 5. Special Precautions

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 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 (1-800-426-4791).

**Lead:** 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. Duknam WTP 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 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 [www.epa.gov/safewater/lead](http://www.epa.gov/safewater/lead).

**Copper:** The primary sources of copper in drinking water are corrosion of household plumbing systems and erosion of natural deposits. Copper enters the water (leaches) through contact with the plumbing. Copper leaches into water through corrosion – the dissolving or wearing away of metal caused by a chemical reaction between water and plumbing. Copper can leach into water primarily from pipes, but fixtures, faucets (brass), and fittings can also be a source of copper contaminants. The amount of copper in your water also depends on the types and amounts of minerals in the water, how long the water stays in the pipes, the amount of wear in the pipes, the water's acidity and its temperature. When water sits in copper pipes or plumbing containing copper for several hours or more, the copper may dissolve into the water. This means the first water drawn from the tap for the day may contain elevated levels of copper. **As a precaution, consumers are encouraged to flush water from their faucets for 30-60 seconds before consumption after the faucet has remained unused for four or more hours.**

## 6. Monitoring Results in Calendar Year 2023

Monitoring results are summarized in the following tables.

**Table 2. 2023 Detected Lead and Copper**

Substance	Violation? Yes / No	Your Water (90 <sup>th</sup> Percentile)	KEGS Action Level (EPA Action Level)	# of Sites Above Action Level <sup>2</sup>	MCLG	Date Sampled	Common Potential Sources in Drinking Water
Lead	No	11.78 ppb	15 ppb (15 ppb)	1 of 8 sites	0	May 2023	Corrosion of plumbing systems; Erosion of natural deposits
Lead	No	14.62 ppb	15 ppb (15 ppb)	1 of 8 sites	0	Dec 2023	
Copper	Yes <sup>1</sup>	1.51 ppm	1.0 ppm (1.3 ppm)	3 of 8 Sites	1.0	May 2023	Corrosion of plumbing systems; Erosion of natural deposits
Copper	Yes <sup>1</sup>	1.98 ppm	1.0 ppm (1.3 ppm)	5 of 8 sites	1.0	Dec 2023	
<sup>1</sup> Refer to the paragraphs below and Table 6 for further details about this exceedance. <sup>2</sup> 40 sites were sampled in accordance with KEGS guidance. However, during each sampling event a small number of samples were invalidated due to reasons such as lab error, mishandling, etc.							

### Lead and Copper Notice:

During the semi-annual water sampling events conducted in May and December 2023, BE collected water samples from Gwangju AB to test for lead and copper levels in the drinking water. During these periods, the KEGS Action Level (AL) was exceeded. In recent years, a trend in higher copper levels has been observed through water quality monitoring records that exceeds the conservative KEGS AL for copper but has not always exceeded the EPA AL for copper. Note that during both monitoring periods in Table 2 above, the results were above both the EPA and KEGS AL.

An AL exceedance is not a violation but can trigger other requirements that include water quality parameter (WQP) monitoring, corrosion control treatment, public education, and service line replacement. More information about these, and other requirements is described in the following paragraphs and in Table 6 of this report.

### Should I be concerned?

Both EPA and United States Forces Korea (USFK) environmental regulations set conservative action levels (ALs). The AL is a measure of the effectiveness of the corrosion control treatment in water systems. The AL is not a standard for establishing safe levels of lead and copper in a home. In addition, the **health advisory level is based on a lifetime exposure of an individual consuming 2 liters of water every day. Considering that most individuals at Gwangju AB are stationed here for a year, adverse health effects are highly unlikely.**

The AL for copper is exceeded if the concentration of copper in more than 10 percent of tap water samples collected during a monitoring period is greater than the 1.0 mg/L (KEGS drinking water requirement). If the AL for copper is exceeded, the operator of that public water system (PWS) must take action to make the water in its drinking water distribution system less corrosive. Additionally, the EPAS has established a maximum contaminant level goal (MCLG) of 1.3 mg/L for copper. A MCLG is the level of a contaminant in drinking water below which there is no known or expected health risk. MCLGs allow for a margin of safety and are non-enforceable public health goals. **The water monitored at Gwangju Air Base during calendar year 2023 was higher than both the KEGS AL and the EPA MCLG.**

## Health Effects Information

Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor.

Very high copper and lead levels are most harmful to adolescents/children and some adults with pre-existing conditions. Signs and symptoms associated with short-term exposure to elevated copper or lead levels include nausea, vomiting, diarrhea, stomach irritation and headaches. If you experience signs or symptoms and believe it may be due to copper or lead exposure, please contact the 8th MDG at DSN 315-782-2273.

## What is being done?

Gwangju AB plans to recoat the Building 156 water tank to address ongoing corrosion concerns. Coordination and preparations for this project are being conducted this year, and the project is scheduled for completion in 2025. If this recoat does not bring copper levels below the KEGS AL, the addition of a soda ash injection capability at the Gwangju AB Water Treatment Plant (WTP) will be pursued. Soda Ash can adjust the pH of the water to make it less corrosive to plumbing materials. In the meantime, BE will continue sampling for lead and copper every six months in accordance with Table 3-6 of the KEGS to monitor the effects of infrastructure changes and to inform both members of the public and water system stakeholders on Gwangju AB. BE, in coordination with Gwangju AB Civil Engineering, will keep all residents posted on findings and recommendations.

## What should I do?

We recommend residents run their faucet for at least 60 seconds before consuming water. This action will flush out most copper particles – empirical evidence shows that copper levels decrease to negligible levels in the line by just letting your tap run for 30-60 seconds. NOTE: The risk of copper ingestion exposure from showering, washing hands, cleaning dishes, brushing teeth, and washing face is minimal. Please continue to adhere to flushing your lines prior to consuming water for drinking or cooking purposes. Boiling does not remove copper from drinking water.

**Table 3. 2023 Detected Disinfection By-Products**

Substances	Violation? Yes / No	Highest Detected Level	Lowest Detected Level	Annual Average	MCLG	EPA MCL (KEGS MCL)	Last Sampled	Common Potential Sources in Drinking Water
Total Trihalomethanes <sup>3</sup> (TTHM)	No	27 ppb	27 ppb	27 ppb	N/A	80 ppb (80 ppb)	Dec 2023	By-product of drinking water disinfection
Haloacetic Acids <sup>4</sup> (HAA5)	No	11.8 ppb	11.8 ppb	11.8 ppb	N/A	60 ppb (60 ppb)	Dec 2023	
<sup>3</sup> Some people who drink water containing trihalomethanes more than the MCL over many years may experience liver, kidney, or central nervous system problems, and may have an increased risk of getting cancer.								
<sup>4</sup> Some people who drink water containing haloacetic acids more than the MCL over many years may have an increased risk of getting cancer.								



**Table 4. 2023 Detected Inorganic Chemicals**

Substance	Violation? Yes / No	Concentration	MCLG	EPA MCL (KEGS MCL)	Last sampled	Common Potential Sources in Drinking Water
Barium	No	0.007 ppm	2	2 ppm (2.0 ppm)	Dec 2023	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Nitrate	No	0.434 ppm	10	10 ppm (10 ppm)	Dec 2023	Fertilizer runoff, Septic tanks leaks, Sewage, Erosion of natural deposits

### 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 U.S., since the 1940s. PFAS have been used to make coatings and products that are used as oil and water repellents for carpets, clothing, paper packaging for food, and cookware. They are also contained in some foams such as aqueous film-forming foam, or AFFF, used for fighting petroleum fires at airfields and in industrial fire suppression processes. PFAS compounds are persistent in the environment, and some are persistent in the human body – meaning they do not break down and they can accumulate over time.

### Is there a regulation for PFAS in drinking water?

In May 2016, the EPA established a lifetime health advisory (LHA) level at 70 parts per trillion (ppt) for individual or combined concentrations of perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). Both compounds are types of PFAS. On 10 April 2024, the EPA published new drinking water standards for certain PFAS under the SDWA. The US Air Force is reviewing the EPA's new rule now and will incorporate these standards into future sampling and analysis efforts.

Out of an abundance of caution, DoD pursued PFAS testing and response actions beyond EPA SDWA requirements. In 2020, the DoD established a policy to monitor drinking water for 17 PFAS compounds at all service owned and operated water systems. If results confirmed the drinking water contained PFOA and PFOS at individual or combined concentrations greater than 70 ppt, water systems quickly took action to reduce exposures. While not a SDWA requirement, in 2023, DoD improved upon its 2020 PFAS drinking water monitoring policy by expanding the list of PFAS compounds monitored to 29, implementing continued monitoring of systems with detectable PFAS over the laboratory Method Reporting Limits (MRL), and requiring initial mitigation planning actions.

### Has Gwangju AB tested its water for PFAS?

Yes. Samples were collected from Building 238 in December 2023. We are informing you that PFAS were not detected in your water system. Drinking water testing results were below the Method Detection Limit (MDL) for all 29 PFAS compounds covered by the sampling method, including PFOA and PFOS. In accordance with current DoD policy, the water system will be resampled every two years for your continued protection.

**Table 5. Per-and Polyfluoroalkyl Substances (PFAS)**

Analyte	Source Water	Location	Result (ppt)	2016 EPA Health Advisory Level	Last Sampled	Violation? Yes / No
Per- and polyfluoroalkyl substances (PFAS) (all 29 compounds)	City Supply	Bldg 238	ND	70 ppt for PFOS+PFOA (N/A for all others)	Dec 2023	No

**Table 6. 2023 Gwangju AB Monitoring Violations**

Monitoring Violation	Explanation	Health Effects	Steps Taken to Correct the Violation
Failure to make public notifications for Copper action level (AL) exceedances	Notification requirements outlined in the KEGS were not followed for copper action level exceedances discovered from sampling events in May and December 2023. The USFK medical authority, Lead Environmental Component (LEC), & installation personnel (U.S. and ROK) must be notified within 14 days.	Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor.	Quality assurance checks for important water quality monitoring requirements have been implemented by Bioenvironmental Engineering (BE) to ensure that public notification procedures are not missed in the future.
Missed monitoring of additional water quality parameters (WQPs) following a copper action level (AL) exceedance	Follow-up monitoring for WQPs was not accomplished after the May and December 2023 sampling events. Samples must be taken in duplicate at specific sites for pH, alkalinity, calcium, conductivity, water temperatures, and other parameters to allow a corrosivity determination. This corrosivity data was obtained during each monitoring period, but not in the manner prescribed in the KEGS.		The BE Flight historically monitors WQPs as part of its standard sampling schedule. However, AL follow-up monitoring requires specific sampling protocols outlined in the KEGS. In the future, the BE flight will conduct follow-up monitoring of WQPs after any AL exceedance per the KEGS.
Education program requirements were not addressed following the copper action level (AL) exceedances	The KEGS outlines requirements for corrosion control treatment actions (no specified timeframe) & an education program (within 60 days) following an AL exceedance. Gwangju AB leadership is taking action on corrosion control treatment plans, but an education program was not implemented within the required 60 days.		Corrosion control treatment is planned for future implementation and is further described elsewhere in this report.  In order to fulfill education program requirements, BE has included educational information for the public in this Consumer Confidence Report and will work with other installation water system stakeholders to publish additional information on the installation's website in the near future.

### Terms Defined

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

**DoD** - Department of Defense.

**EPA** - United States Environmental Protection Agency.

**HAA5** - Haloacetic Acids (bromochloroacetic acid, dichloroacetic acid, monobromoacetic acid, monochloroacetic acid, and trichloroacetic acid)

**KEGS** - Korean Environmental Governing Standards.

**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.

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

**N/A** - Not applicable, No MCL established.

**ND** - Means not detected and indicates that the substance was not found by laboratory analysis.

**Part per million (ppm)** – 1/1,000,000; One ppm corresponds to 1 minute in 2 years, or a single penny in \$10,000.

**Part per billion (ppb)** – 1/1,000,000,000; One ppb corresponds to 1 minute in 2,000 years, or a single penny in \$10,000,000.

**Part per trillion (ppt)** – 1/1,000,000,000,000; One ppt corresponds to 1 minute in 2,000,000 years, or a single penny in \$10,000,000,000.

**SWDA** – The U.S. Safe Drinking Water Act is a law passed by Congress in 1974 to protect public health by regulation public drinking water supplies. This law contains multiple provisions and details are available at <https://www.epa.gov/sdwa>.

**TTHM** - Total Trihalomethanes

## For more information

### **Organization**

8 OMRS Bioenvironmental Engineering  
607 MMS Civil Engineering

### **DSN**

315-782-6541  
315-766-4569

### **Service Area**

Drinking water quality concerns  
Drinking water system concerns

**E-mail: [usaf.kunsan.8-mdg.mbx.8-omrs-sgxb@health.mil](mailto:usaf.kunsan.8-mdg.mbx.8-omrs-sgxb@health.mil)**