OSAN AIR BASE DRINKING WATER CONSUMER CONFIDENCE REPORT 2020 (Covering Calendar Year 2019)

이 보고서에는 귀하의 식수에 대한 중요한 내용이 실려있습니다. 그러므로 이 보고서를 이해할 수 있는 사람한테 번역해 달라고 부탁하시기 바랍니다. 보고서에 대한 질문은 생물환경공학과 784-2623 로 문의 하시기 바랍니다.

This consumer confidence report provides information about the Osan Air Base drinking water quality for the calendar year (CY) 2019. This report is based on data that the Bioenvironmental Engineering Flight of the 51st Aerospace Medicine Squadron assesses, documents, and includes information about how the 51st Civil Engineer Squadron operates and maintains the system. Please review this report for your information. If you have any questions, please call the Bioenvironmental Engineering Flight at 784-2623.

Sampling To Ensure Your Water Quality

Bioenvironmental Engineering performs water monitoring throughout the year and ensures that your drinking water is the same quality as in the United States. In CY 2019, your tap water met all the quality standards in the Safe Drinking Water Act and the United States Forces Korea Environmental Governing Standards for drinking water.

Drinking Water Contaminants and Your Health

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, in some cases, radioactive material, and substances resulting from the presence of animals or 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 - may come from a variety of sources such as agriculture, storm water runoff, and residences.
- Organic chemical contaminants - including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, can also come from gas stations, urban storm water runoff, and septic systems.
- Radioactive contaminants - can be naturally occurring or be the result of oil and gas production and mining activities.

To ensure that tap water is safe to drink, the Environment Protection Agency (EPA) prescribes regulations that limit the amount of certain contaminants in drinking 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.

Drinking water, including bottled water, may reasonably be expected to contain small amounts of some contaminants. The presence of contaminants does not necessarily indicate the water poses a health risk. You can call the EPA Safe Drinking Water Hotline (1-800-426-4791) for more information about contaminants and potential health effects.

Vulnerable Individuals

Some people may be more susceptible to the effects of 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 at greater risk of infections. These people should seek advice about drinking water from their health care providers. The EPA and the Centers for Disease Control provide guidelines to lessen the risk of infection by Cryptosporidium and other microbial contaminants. These guidelines are available from the Safe Drinking Water Hotline (1-800-426-4791).

Osan Air Base Water Sources

The primary water source for Osan Air Base is the Han River upstream from Seoul. A collection point outside of Seoul pumps the water to the Sungnam Municipal Water Treatment Plant (WTP) before the WTP supplies the treated water to the base. This treatment includes settling, chemical mixing with powdered activated carbon, flocculation, sedimentation, filtration, and chlorination. The WTP also mixes aluminum sulfate and lime during the summer months to aid in coagulation. In addition, the Osan Air Base WTP adds chlorine to provide additional disinfection.

What about the Taste and Color of My Water?

Bioenvironmental Engineering performs weekly representative sampling of the water distribution system; thus, Bioenvironmental Engineering does not routinely sample all buildings on base. It is possible that the plumbing in individual buildings can affect water palatability (i.e., taste). Facility managers and building occupants can often minimize these effects through routine maintenance practices. The Bioenvironmental Engineering Flight (784-2623) is ready to help with any drinking water issue. In the interest of time, please work with your facility manager to conduct routine preventive maintenance on the plumbing in your building before contacting our office.

Some common water palatability issues and corresponding routine maintenance practices are listed below:

1. Rusty pipes: Older metal pipes may rust, resulting in water with reddish-brown color or occasionally small solid particles. This condition is unsightly, but is not a health problem. Rusty pipes affect water most often when water is stagnant, e.g., when water sits in pipes over a long weekend. Facility managers can minimize rusty water by flushing affected pipes (running the water for 30-60 seconds) first thing in the morning, especially on long holiday weekends. **Consumers also can minimize rusty water by flushing their taps until the water appears clear (usually 30 - 60 seconds) before use.**

2. Cloudy/Milky water: Pressure in pipes dissolves gases (usually air or carbon dioxide) in the water. When water comes out of the tap, the pressure is reduced and the dissolved air forms tiny bubbles, giving the water a cloudy appearance. To determine if gas bubbles are causing cloudy water, fill a glass with water and watch it for a minute. If the cloudiness gradually rises to the top of the glass and the water clears, the cloudiness is caused by gas bubbles and is harmless. If the cloudiness persists for more than two minutes or settles to the bottom of the glass, then gas bubbles are not the issue.

3. Dirty water coolers/drinking fountains: Water coolers can become unsightly and unsanitary if not cleaned regularly. Water contains natural minerals that can precipitate near the fountain-head. Since the water cooler surface is often wet, bacteria can grow on the outer surface. This can lead to unpleasant tasting water. Facility managers must maintain cleanliness of the outer surfaces of all water coolers and ensure the water cooler drains are not clogged. In-line filters are sometimes placed on water coolers, but should rarely be necessary. Filters installed on the water coolers must be replaced according to the manufacturer's recommendations.

Frequently asked questions about lead

Where does the lead originate?
Lead is a common metal that can be found throughout our environment in the air, lead-based paint, soil, household dust, and food. It can also be found in certain types of pottery, porcelain, and pewter. Lead is also present in plumbing fixtures made of brass and in solder used by plumbers before 1987.

Why is lead a health concern?
Lead is a toxic material, known to be harmful to human health if ingested or inhaled. Lead in the body can cause damage to the brain, kidneys, nervous system, and red blood cells. Children, infants, pregnant women, and their unborn children are especially vulnerable to lead. In children, lead has been associated with impaired mental and physical development as well as hearing problems. The harmful effects of lead in the body can be subtle and may occur without any obvious signs of lead poisoning.

Blood levels as low as 10 micrograms per deciliter (ug/dL) are associated with harmful effects on children’s learning and behavior. Minimizing sources of exposure to lead can help reduce the number of children with elevated blood lead levels.

Although drinking water is not typically the primary source of lead exposure in children, it can contribute to total lead exposure. Lead can also be introduced into the body through soil and air, which contributes to the total amount of lead exposure. In response, the EPA has set a cumulative blood lead level of less than 10 ug/dL. Therefore, reducing the amount of lead in the drinking water is an important part of reducing a child’s overall exposure to lead in the environment. **The measured concentration at Osan are all below the action level.**

Why do some faucets have high lead levels?
Lead is unusual among drinking water contaminants because it seldom occurs naturally in water supplies like rivers and lakes. Lead enters drinking water as a result of corrosion or wearing away of materials containing lead in the facility plumbing. These materials include lead-based solder used to join copper pipe, in addition to lead in brass and chrome plated brass faucets. In 1986, Congress banned the use of lead solder containing more than 0.2% lead and restricted the lead content of faucets, pipes, and other plumbing materials to 8.0%. When water sits in lead pipes or plumbing containing lead for several hours or more, the lead may dissolve into the water. This means the first water drawn from the tap for the day may contain elevated levels of lead. **As a precaution, consumers are encouraged to flush water from their faucets for 60 seconds before consumption after the faucet has remained unused for 4 or more hours.**

Frequently asked questions about copper

How does copper get into my drinking water? 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 – dissolving or wearing away of metal caused by a chemical reaction between water and your plumbing. Copper can leach into water primarily from pipes, but fixtures, faucets (brass), and fittings can also be a source. 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 60 seconds before consumption after the faucet has remained unused for four or more hours.**

Why is copper a health concern?
Some people who drink water containing copper in excess of the action level may, with short-term exposure, experience gastrointestinal distress, and with long-term exposure may suffer liver or kidney damage. Individuals with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level. **The measured concentration at Osan are all below the action level.**

The above information on the health effects of copper is not intended to catalog all possible health effects for copper. Rather, it aims to inform consumers about the possible health effects associated with copper in drinking water relevant to the EPA (Environmental Protection Agency) regulatory standards.

Monitored Contaminants

During CY 2019, Bioenvironmental Engineering collected 373 samples to monitor for 92 different contaminants. In addition, the Civil Engineer Squadron monitored chlorine levels daily and Bioenvironmental Engineering monitored chlorine levels weekly. Table 1 lists all of the contaminants monitored in CY 2019 and the required monitoring frequency for each contaminant group.

Table 1. CY 2019 Sample Contaminant Groups & Monitoring Frequencies

Contaminant Group	Number of Contaminants Monitored	Examples	Monitoring Frequency
Biological Contaminants	3	Total coliform, fecal coliform, etc.	Monthly
Inorganic Contaminants	16	Metals, fluoride, etc.	Annually
Nitrate, Nitrite, Total Nitrate/Nitrite	3	--	Quarterly
Volatile Organic Compounds (VOCs)	21	Benzene, toluene, trichloroethylene (TCE), etc.	Annually
Synthetic Organic Compounds (SOCs)	33	Pesticides, polychlorinated biphenyls (PCBs), etc.	Semi-annually
Total Trihalomethanes (TTHMs)	4	Bromoform, chloroform, etc.	Quarterly
Haloacetic acids (HAA5)	5	Monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, etc.	Quarterly
Lead and Copper	2	--	Annually
Perfluorooctane Sulfonate (PFOS), perfluorooctanoic Acid (PFOA)	2	--	Annually
Radiological Compounds	3	Gross alpha, radium 226/228, etc.	Every 4 years; sampled in CY 2019
Asbestos	1	--	Every 9 years; sampled in CY 2014

Table 2 lists the microbial contamination results for CY 2019. No microbial contaminants were detected in any drinking water samples.

Table 2. CY 2019 Biological Sampling Results

Contaminant	MCLG*	MCL*	Level Detected	Meet Standard?	Potential Source of Contaminant
Total Coliform	0	0 positive sample/ month	0 positive samples	***Yes***	Naturally present in environment
Fecal Coliform and E. coli	0	0 positive samples/ month	0 positive samples	***Yes***	Human or animal fecal waste

* See Appendix for explanation of terms and abbreviations

Table 3 lists all of the drinking water contaminants that were detected in CY 2019. The presence of contaminants in the water does not necessarily indicate that the water poses a health risk. For total trihalomethanes and haloacetic acids, compliance is based on the running average of all samples collected over a year. Therefore, if a single sample exceeds the MCL, but the average of all the readings for that year is less than the MCL, then the system is in compliance.

Table 3. CY 2019 Detected Water Contaminants

CONTAMINANTS	**EPA**		**KEGS***	**Your Water**		**Meet Standard?**	**Typical Source**
	MCLG*	**MCL***	**MCL**	**Low**	**High**		
Inorganic Contaminants							
Barium in ppm	2	2	2	0.017	0.017	***Yes***	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Nitrate [measured as Nitrogen in ppm]	10	10	10	1.14	2.52	***Yes***	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Total Nitrate and Nitrite in ppm	NR	NR	10	1.14	2.52	***Yes***	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Sodium in ppm	NR	NR	NR	15.4	14.7	***Yes***	Erosion of natural deposits
Total Trihalomethanes							
Total Trihalomethanes in ppb	NR	80 (annual average)	80 (annual average)	26.4	73.7	***Yes***	By-product of drinking water chlorination
				Annual average 49.27			
Haloacetic Acids							
Haloacetic Acids in ppb	NR	60 (annual average)	60 (annual average)	19.3	55.0	***Yes***	By-product of drinking water chlorination
				Annual average 42.49			

*See Appendix for explanation of terms and abbreviations. Bioenvironmental Engineering tested for Semi-Volatile Organic Chemicals and Volatile Organic Chemicals and detected none.

Table 4 lists the Lead and Copper results for CY 2019. The standard for lead and copper is that no more than 10% of samples exceed the action level. Lead and Copper monitoring for Osan Air Base has consistently met this requirement for the past 10 years.

Table 4. CY 2019 Lead and Copper Sample Results

Contaminant	EPA		KEGS*	# of sample sites exceeding action level	90th percentile value	Meet standard?	Potential Source of Contaminant
	MCLG*	AL*	AL*				
Lead in ppb	0	15	15	0 of 50 sites	ND	***Yes***	Corrosion of household plumbing systems; erosion of natural deposits.
Copper in ppb	1300	1300	1300	0 of 50 sites	210.12	***Yes***	Corrosion of household plumbing systems; erosion of natural deposits.

*See Appendix for explanation of terms and abbreviations

Table 5 lists radiological contaminants results for CY 2019. The results presented in this report are from the most recent testing conducted in accordance with the KEGS: the monitoring frequency of radiological contaminants is every 4 years. The presence of regulated radiological contaminant in the water does not necessarily indicate that the water poses a health risk.

Table 5. CY 2019 Detected Radiological Contaminants

Contaminant	EPA		KEGS* MCL	Your Water	Meet Standard?	Likely Source of Contaminant
	MCLG*	MCL*				
Gross Alpha in pCi/L	0	15	15	ND	***Yes***	Erosion of natural deposits
Combined Radium 226 and 228 in pCi/L	0	5	5	ND	***Yes***	Erosion of natural deposits
Uranium in ppb	0	30	30	ND	***Yes***	Erosion of natural deposits

*See Appendix for explanation of terms and abbreviations

Table 6 lists asbestos result for CY 2014. The result presented in this report is from the most recent testing conducted in accordance with the KEGS: the monitoring frequency of asbestos is every 9 years. The presence of regulated asbestos in the water does not necessarily indicate that the water poses a health risk.

Table 6. CY 2014 Detected Asbestos

Contaminant	EPA		KEGS	Your Water	Meet Standard?	Likely Source of Contaminant
	MCLG*	MCL*	MCL*			
Asbestos MFL*	7	7	7	<0.1	***Yes***	Decay of asbestos cement water mains; Erosion of natural deposits

*See Appendix for explanation of terms and abbreviations

Table 7 lists Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA) results. These two compounds are currently not regulated compounds in both the EPA and the KEGS. However, these compounds are classified as emerging contaminants due to evolving regulatory standards; On 19 May 2016, the EPA established lifetime health advisory levels of 70 parts per trillion of PFOS and PFOA in drinking water. Although PFOS/PFOA are unregulated, the Air Force is taking aggressive measures to reduce the risk of mission-related PFOS/PFOA contamination to installation and supporting community's drinking water sources. Bioenvironmental Engineering amended its sampling plan to include the PFOS/PFOA contaminants as additional annual sampling requirement.

Table 7. CY 2019 Non Regulated Compounds

Contaminant	EPA	Your Water	Meet Health Advisory?	Likely Source of Contaminant
	Health Advisory			
PFOS/PFOA in ppt*	70	ND	***Yes***	Component of aqueous film forming foam, a Firefighting foam

*See Appendix for explanation of terms and abbreviations

Where Can I Get More Information?

The Base Drinking Water Working Group (DWWG) meets every 3 months at building 600. If you have any specific questions or concerns about your drinking water, please contact the Osan Air Base Bioenvironmental Engineering (BE) office at 784-2623. BE can bring your questions or concerns to the DWWG and respond back to you. You can also contact the BE office for any additional information on drinking water or questions regarding this Consumer Confidence Report (CCR).

The Bioenvironmental Engineering Flight prepared this CCR and will post it on the Osan Air Base homepage (http://www.osan.af.mil).

Information about EPA water regulations can be found at http://www.epa.gov.

General information about Korean water sources in English and Korean can be found at http://www.kwater.or.kr.

APPENDIX

DEFINITIONS

Action Level (AL): The level of lead or copper which, if exceeded, triggers treatment or other requirements that a water system must follow.

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 known or expected risk to health. MCLGs allow for a margin of safety.

Non-detect (ND): The contaminant was not detected in the sample.

Not Regulated (NR): The EPA and/or KEGS have not determined a regulatory limit for the contaminant in drinking water.

Safe Drinking Water Act (SDWA): The main federal law that ensures the quality of Americans' drinking water. Under SDWA, EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards.

Units

MFL: million fibers per liter (a measure of asbestos in drinking water).

PCi/L: picocuries per liter (a measure of radioactivity).

Parts per billion (ppb): A ppb is a thousandth of a ppm.

Parts per million (ppm): Parts per million is the most commonly used term to describe minuscule amounts of contaminants in our environment. They are measures of concentration, the amount of one material in a larger amount of another material; for example, the weight of a toxic chemical in a certain volume of water. If you divide a liter of water into a million parts, then each part would be minuscule and would represent a millionth of the total liter or one part per million of the original liter.

Parts per trillion (ppt): A ppt is a thousandth of a ppb.