2023 Annual Drinking Water Quality Report

(Consumer Confidence Report)

RAMSTEIN AIR BASE, GERMANY

This report contains important information about your drinking water. If you do not understand it, please have someone explain or translate it for you.

Dieser Bericht enthält wichtige Informationen zu Ihrem Trinkwasser. Wenn Sie diesen Bericht nicht lesen können, lassen Sie ihn sich von jemandem erklären oder übersetzen.

Introduction

The Bioenvironmental Engineering (BE) Flight is pleased to present this year's Annual Drinking Water Quality Report (Consumer Confidence Report – CCR) for Ramstein Air Base (AB) and the surrounding Kaiserslautern Military Community (KMC), specifically for Air Force owned assets, as required by Department of the Air Force Instruction 48-144, *Drinking Water Surveillance Program*, and the Final Governing Standards for Germany (FGS-G). This report provides an overview of the 2023 drinking water quality from 1 January 2023 through 31 December 2023 and details about where your water comes from, what it contains, and how it compares to standards set by regulatory agencies. We hope this report will raise your understanding of drinking water issues and awareness of our need to protect your drinking water sources. Our goal is to provide you with a safe, quality, and reliable drinking water supply. We are committed to providing you with this information because informed customers are the best allies.

Water Sources

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 in some cases, natural radioactive material, and can pick up substances resulting from the presence of animals or from human activity. In order to ensure that tap water is safe to drink, the final governing standard for Germany, published in 2020, prescribes regulations which 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 which must provide the same protection for public health.

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: which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.

- 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, urban storm water runoff, and septic systems.

- Radioactive Contaminants: which can be naturally occurring or be the result of oil and gas production and mining activities.

- Per- and Polyfluoroalkyl Substances (PFAS): a group of thousands of man-made chemicals used in a variety of industries and consumer products around the globe since the 1940s.

Where do we get our drinking water?

The Kaiserslautern Military Community (KMC) drinking water systems provide water to approximately 16,000 customers at Ramstein Air Base (AB). Bioenvironmental Engineering (BE) collects a total of 29 samples per month at multiple locations around the installation, the Contingency Training Squadron compound, Bann, and Einsiedlerhof. Additional samples are collected to meet AF unique requirements and ensure water quality across the entire installation. Ramstein AB water systems are classified as community water systems by HQ USAFE/AFRICA and German Authorities.

The KMC area draws all its drinking water from deep wells several hundred feet below ground. The water is pumped from these wells, treated, and then distributed to our communities. Within the KMC, there are many water distribution systems. Ramstein AB has one system, supplied by three water treatment facilities. Since 2016, the two Contingency Training Squadron systems are supplied with potable water from the City of Ramstein-Miesenbach. Since November 2007, Vogelweh, including Kapaun Air Station, is supplied from the City of Kaiserslautern water provider Stadtwerke Kaiserslautern (SWK).

Drinking Water and Your Health

All 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 the water poses a health risk. More information on contaminants and potential health effects can be obtained by calling BE at DSN 314-479-2220 (+49-6371-46-2220). Some people may be more vulnerable to contaminants in drinking water than the general population.

Immunocompromised 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 are more susceptible to risk of infection. These people should seek advice about drinking water from their health care providers. The Environmental Protection Agency (EPA) and Center for Disease Control (CDC) published guidelines on appropriate means to lessen the risk of infection from Cryptosporidium and other microbial contaminants and are available from the Safe Drinking Water Hotline (1-800-426-4791).

Is there Lead in my Water?

Although BE regularly tests lead levels in the drinking water, it is possible that lead and/or copper levels at your home are higher because of materials used in the plumbing. If present, elevated levels of lead can cause serious 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. Ramstein AB 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 and copper exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. However, when BE collects lead samples, it is taken from the first draw (without flushing) to get an accurate representation of how much potential lead is being released (if at all), and action levels for lead were not exceeded in 2023. 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 at 1-800-426-4791 or http://www.epa.gov/safewater/lead.

What is 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 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 Environmental Protection Agency (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 Safe Drinking Water Act (SDWA). AF 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, and requiring initial mitigation planning actions.

Has Ramstein AB tested its water for PFAS?
Yes, in December 2023 samples were collected from all three water plants.

PFAS detected above the Minimum Detection Limit (MDL), but PFOA/PFAS were below the 70 ppt.
This is to inform you that 9 of the 29 compounds covered by the sampling method were detected above the MDL. The results are provided in the table below, and a public notification of these sample results will be provided in 2024 via the Ramstein AB website. PFOA was detected above the MDL, but below the health advisory of 70 ppt, and the results for PFOS were below the MDL. As PFOA and PFOS were below the 70 ppt, there is no immediate cause for concern and we will continue to monitor the drinking water closely. In accordance with DoD policay, Ramstein AB will collect semiannual samples for PFAS and periodic updates will be provided via the base website.

A Final Word on Water Quality

Your water quality team at Ramstein AB works around the clock to provide safe, dependable water at every tap. But they can only ensure the success of today's mission if everyone contributes. Tomorrow's success will depend on all of us, working together, to protect our vital water resources.

Remember, the water we use does not quickly return to the aquifer, but is, for the most part, "consumed" by our actions. The military installation (Ramstein AB) and many nearby villages draw water from the same aquifer. Conservation is therefore essential to protect our water supply.

You should also consider ways you can reduce your water consumption, i.e. don't let the water run while brushing your teeth, take a shower versus taking a bath. There are numerous ways to save our most valuable natural resource for us and the future of our children. If you have ideas to reduce usage and contamination of this valuable resource, submit it to the Ramstein AB Drinking Water Quality Working Group (POC – BE). These efforts will help protect the future water supply by reducing the overall consumptive use.

Customer Reviews Welcome

We are available to address any questions or concerns you may have. Housing residents should contact the Housing Office with any water concerns. Dorm residents should contact their building manager or their Airman Dorm Leader.

For more information on this report or base drinking water quality, please call BE at DSN 314-479-2220 (0049-6371-462220) or the 86 CES Environmental Management Flight at DSN 314-480-7712.

About the Following Pages

The table below lists all of the drinking water contaminants that we detected during the calendar year of this report. Although more than **90 contaminants** were tested, only those substances listed below were detected in our water. All sources of drinking water contain some naturally occurring contaminants. The FGS-G requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants do not vary significantly from year to year, or the system is not considered vulnerable to this type of contamination. If this changes, and levels are elevated, increased monitoring frequency will occur in accordance with the FGS-G.

Definitions and Abbreviations

Action Level (AL): the concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
Average: regulatory compliance with some Maximum Contaminant Levels (MCLs) are based on running annual average of monthly samples.
Haloacetic Acids (HAA5): a type of disinfection byproduct when adding chlorine to the water as a treatment method.
Maximum Contaminant Level (MCL): the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the Maximum Contaminant Level Goal (MCLG) 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.
Maximum Residual Disinfectant Level (MRDL): the highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
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 contamination.
Milligrams per liter (mg/L): unit of measurement for concentration by weight of a substance in the water.
millirem per year (mrem/yr): a measure of radiation absorbed by the body.
Million Fibers per Liter (MFL): a measure of the presence of asbestos fibers that are longer than 10 micrometers.
Minimum Detection Limit (MDL): a detection limit for the lab to be able to detect the chemical of concern in the water.
Nephelometric Turbidity Units (NTU): measurement of the clarity, or turbidity, of water.
Non-Detect (N.D.): a measurement used when the sample result was below the detection capabilities of the lab.
Picocuries per Liter (pCi/L): measurement of the natural rate of disintegration of radioactive contaminants in water.
pH: measurement of acidity/basicity with7.0 being neutral.
parts per trillion (ppt): one part substance per trillion parts water, or nanograms per liter.
Running Annual Average (RAA): average results for the most recent four quarters.
Secondary Maximum Contaminant Level (SMCL): recommended level for a contaminant that is not regulated and has no MCL.
Total Trihalomethanes (TTHM): a set of chemicals that are disinfection byproducts.
Treatment Technique: a required process intended to reduce the level of a contaminant in drinking water.

How to Read the Data Tables

Starting with a substance, read across. The year sampled is 2023 (January through December). MCL shows the highest level of contaminant allowed. MCLG is the goal level for that substance (this may be lower than what is allowed). Average Amount Detected represents the measured amount (less is better). Range tells the highest and lowest amounts measured. A 'No' under Violation means the amount of substance met government requirements. A "Yes" under Violation means there was an exceeded sample that required a public notification to either inform residents of the potetential increased risk, or a "do not drink" notice. Typical Source tells where the substance usually originates. Unregulated substances are measured, but maximum allowed contaminant levels have not been established by the government.

Missed Sampling Parameters

BE is required to sample over 90 chemicals for three water plants and several more locations across the installation. Depending on the parameter, samples are required monthly, quarterly, annually or greater. This leads to over 250 samples collected annually. Sometimes, sampling parameters can be missed for several different reasons, from miscommunication with ordering the sampling kits, the language barrier when communicating with a host nation lab, broken sampling bottles that cannot be analyzed after collection, or human error. If there was an increased risk due to missing any samples, this would have been communicated within 30 days of missing the parameter. Below is a list of sampling parameters that were missed in 2023.

Parameter	Frequency	Missed Frequency	Increased Risk?
Aluminum	Quarterly	Quarter 1 and Quarter 2	No
Chlordane (Pesticide)	Quarterly	Quarter 2	No
Bromate	Quarterly	Quarter 1	No
All VOCs	Quarterly	Quarter 2	No
Lead & Copper	Semiannually	Only collected 58 of 60 in first half	No

Water Quality Results for Detected Chemicals

Contaminant	Unit of Measure	MCLG[2]	MCL	Level Found	Violation	Typical Source
Total Coliform	# of Positives	0	5% of Monthly Samples	2	**Yes[1]**	Naturally present in the environment
E. Coli	# of Positives	0	Any Positive	1	**Yes[1]**	Contamination from sewage or animal waste
Barium	mg/L	2.0	2.0	0.3	No	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Trichloroethylene	mg/L	0	0.005	0.0031	No	Discharge from factories and dry cleaners
Chloroform (TTHM)	Sum, mg/L	0.07	-	0.0025	No	By-products of drinking water chlorination
Bromodichloromethane (TTHM)	Sum, mg/L	0	-	0.0015	No	By-products of drinking water chlorination
Dibromochloromethane (TTHM)	Sum, mg/L	0.06	-	0.0012	No	By-products of drinking water chlorination
Tribromomethane (TTHM)	Sum, mg/L	0	-	0.0010	No	By-products of drinking water chlorination
Total TTHMs	mg/L	N/A	0.08	0.0062	No	By-products of drinking water chlorination
Cis-1-2-dichloroethene	mg/L	0.07	0.07	0.012	No	Discharge from industrial chemical factories
Nitrate	mg/L	10	10	2.8	No	Runoff from fertilizer use; leaking from septic tanks, sewage; erosion of natural deposits
Dalapon	mg/L	0.2	0.2	0.00054	No	Runoff from herbicide used on rights of way
Nickel	mg/L	N/A	0.1	0.0031	No	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Sodium	mg/L	N/A	N/A	15.9	No	Naturally present in the environment

Contaminant	Unit of Measure	MCLG[2]	MCL	Level Found	Violation	Typical Source
Thallium	mg/L	0.0005	0.002	0.00025	No	Runoff from cement factories, coal burning power plants and metal sewers
Heptachlorepoxide	mg/L	0	0.0002	0.00005	No	Runoff from the insecticide product, heptachlor
Bromoacetic Acid (HAA5)	Sum, mg/L	N/A	-	0.0014	No	Disinfectant byproduct when adding chlorine as treatment
Dibromoacetic Acid (HAA5)	Sum, mg/L	N/A	-	0.0013	No	Disinfectant byproduct when adding chlorine as treatment
Chloroacetic Acid (HAA5)	Sum, mg/L	0.07	-	0.0096	No	Disinfectant byproduct when adding chlorine as treatment
Dichloroacetic Acid (HAA5)	Sum, mg/L	0	-	0.0039	No	Disinfectant byproduct when adding chlorine as treatment
Trichloroacetic Acid (HAA5)	Sum, mg/L	0.02	-	0.0052	No	Disinfectant byproduct when adding chlorine as treatment
Total HAA5s	mg/L	N/A	0.06	0.034*	No	*Level is highest sum recorded in a quarter
Aluminum	mg/L	N/A	N/A	0.011	No	Aluminum salts added to the water as coagulant to treat turbidity, organic matter and microorganisms
Combined Radium	pCi/L	5	5	1.193	No	Naturally occurring radiation within the ground that seeps into groundwater
Gross Alpha	pCi/L	15	15	5.5946	No	Naturally occurring radioactive material, test for total radioactivity for alpha particles
Gross Beta	mrem/yr	4	4	1.3	No	Naturally occurring radioactive material, test for total radioactivity for beta particles

Notes:

1: See the violations section below for more details on the actions taken to mitigate the exceeded MCL.

2: Each individual TTHM and HAA5 have an MCLG, but the MCL is for the sum of all TTHMs and HAA5s respectively. There is no violation for exceeding an MCLG.

Residual Disinfectants	Unit of Measure	MRDL	MRDLG	Average Level	Minimum Level	Maximum Level	Violation	Typical Source
Free Available Chlorine	ppb	4000	4000	200	10	1140	No	Water additives used to control microbes
Bromate	mg/L	0.010	<0.010	0.01317	N.D	0.05	**Yes[1]**	Disinfectant byproduct when treating the water

Notes:

1: See the violations section below for more details on the actions taken to mitigate the exceeded MCL.

Lead and Copper	Units	AL	AL Exceeded?[1]	90th Percentile	# Sites Over AL	Violation	Typical Source
Lead	mg/L	0.015	No	0.004	3[2]	No	Corrosion of household plumbing systems; erosion of natural deposits.
Copper	mg/L	1.3	No	0.217	0	No	Erosion of natural deposits; leaching from wood preservatives; corrosion of household plumbing systems.

Notes:

1: To exceed the AL with lead and copper, over 10% of the samples need to exceed the AL. BE collects 60 samples per event in accordance with the FGS-G in relation to the base population. 10% would be 6 samples per sampling event.

2: Two sites were above the AL during the first half of the year. Building 2314 (0.017 mg/L) and Building 2472 (0.044 mg/L) were above the action level. During the second sampling event in the latter half of the year, building 2314 (0.13 mg/L) was above the AL.

PFAS[1]	Unit of Measure	Water Plant 1	Water Plant 2	Water Plant 4	Violation
Perfluorobutanesulfonic Acid (PFBS)	ppt	7.93	7.25	N.D.	No
Perfluorohexanoic Acid (PFHxA)	ppt	28.4	60.7	N.D.	No
Perfluoroheptanoic Acid (PFHpA)	ppt	8.11	3.31	N.D.	No
Perfluorohexanesulfonic Acid (PFHxS)	ppt	87.3	3.28	N.D.	No
Perfluorooctanoic Acid (PFOA)	ppt	46.6	3.37	N.D.	No
Perfluorooctanesulfonic Acid (PFOS)	ppt	N.D.	N.D.	N.D.	No

PFAS[1]	Unit of Measure	Water Plant 1	Water Plant 2	Water Plant 4	Violation
Fluorotelomer Sulphonic Acid 6:2 (6:2 FTS)	ppt	4.07	N.D.	N.D.	No
Perfluorobutanoic Acid (PFBA)	ppt	7.83	18.6	N.D.	No
Perfluoropentanoic Acid (PFPeA)	ppt	26.4	98.5	N.D.	No
Perfluoropentanesulfonic Acid (PFPeS)	ppt	8.00	1.07	N.D.	No

Notes:

1: The 70 ppt health advisory only applies to the combination of PFOS and PFOA.

Violations

Violation 1: E. Coli Detection

E. coli is a bacteria that comes from human or animal wastes, and when ingested can cause short-term illness such as diarrhea, nausea, headaches, and other gastroinstestinal-related symptoms. The MCL for E. coli in the drinking water is any sample where the bacteria is detected. This violation was detected and reported in accordance with the FGS-G.

Violation Type	Violation Begin	Violation End	Violation Explanation
MCL	19 September 2023	21 September 2023	BE conducted a routine water sample on 19 September 2023 at Bldg 51, Cold Storage, after the water treatment plant that supplied water to that building malfunctioned. A temporary solution of providing water from Ramstein's distribution system and storing the water within a tank to provide enough volume of water to support the building was established. The sample had positive identification of E. coli bacteria. "Do Not Drink" signs were immediately posted and bottled water was provided while BE and CE determined the source of the contamination. BE suspected that the contamination could be linked to the water tank and an additional four samples were collected on 20 September 2023. All four samples came back positive for E. coli contamination. A new temporary solution of supplying the water to the facility via a nearby fire hydrant was established. On 21 September 2023, two more samples were taken, one at the original water tank and the other at the fire hydrant. The sample from the water tank was positive for contamination, and the fire hydrant results were negative. It was confirmed that the storage tank was the source of contamination and removed from use until it could be cleaned. BE added Bldg 51 to the weekly rotation of water sampling to ensure the temporary solution was still effective. For the remainder of 2023, BE did not have another positive sample for E. coli and the violation was resolved on 21 September 2023.

Violation 2: Bromate MCL Exceedance

A lifetime of drinking bromate at higher levels has an increased lifetime cancer risk of 2 in 10,000. Some people who ingested large amounts of bromate had gastrointestinal symptoms such as nausea, vomiting, diarrhea and abdominal pain. Some individuals who ingested very high concentrations of bromate also experienced adverse effects in kidney, nervous system, and hearing loss. However, the levels of bromate were low, but still slightly exceeding the MCL. The violation was detected and reported in accordance with the FGS-G. The MCL for bromate is a running annual average.

Violation Type	Violation Begin	Violation End	Violation Explanation
MCL	27 November 2023	TBD	BE performs quarterly sampling of Bromate in Ramstein AB's drinking water system. During the third quarter sampling period, it was identified that Ramtein AB's drinking water system had exceeded the MCL of 0.01 mg/L. The results were 0.0167 mg/L. Two of the three water plants exceeded for bromate in the third and fourth quarters of 2023. BE is still working with CE on resolving the elevated levels. The courses of action to reduce bromate levels are to replace the filters at the two water plants of concern, clean the water storage tanks, and a review of the storage conditions for the treatment chemicals to ensure they are meeting the manufacturers' specifications. When the violation is resolved, a public notification will be pushed to inform the customers.

Violation 3: Total Coliform (Bacteria) MCL Exceedance

Total coliforms are naturally occurring bacteria that grows within the water, and the MCL for exceeding more than the allowable amount of bacteria is more than one positive sample per month. Drinking water with excessive bacteria could result in short-term illness such as diarrhea, nausea, headaches, and other gastroinstestinal-related symptoms. This violation was detected and reported in accordance with the FGS-G.

Violation Type	Violation Begin	Violation End	Violation Explanation
MCL	22 August 2023	24 August 2023	During BE's routine monthly sampling around the base, two samples were identified to have an excessive level of bacteria. When a positive sample is detected, BE is required to resample the same location, as well as upstream and downstream of the location. During the resamples, all six sample results were negative for excessive bacteria. The buildings affected were cleared and no health risks identified. However, since there were two samples within a month that exceeded the bacteria limits, it was considered a violation of the monthly MCL.