Edwards Air Force Base
California

2022 Water Quality Report

2022 Monitoring Results for Edwards AFB – Main Base (Public Water System ID: CA1510701)
Prepared By: 412th Test Wing – Bioenvironmental Engineering Flight

Annual Consumer Report

We feel it is important that our consumers know about where our water comes from, what it contains, and how it compares to requirements set by regulatory agencies. This report is a snapshot of last year's water quality.

Last year, monitoring and reporting requirements were not met for annual nitrate sampling on Main Base. However, our tap water met or exceeded all other U.S. Environmental Protection Agency (USEPA) and state drinking water health requirements. See page 6 for more information regarding nitrate

Through regular monitoring, any contaminates found were verified to be within regulatory standards. The detected amounts and the associated standards, are included in the tables published within this report.

Where Does Our Water Come From?

The EAFB Drinking Water System draws water from two sources:

- Antelope Valley East Kern (AVEK) Water Agency
- On-base groundwater wells

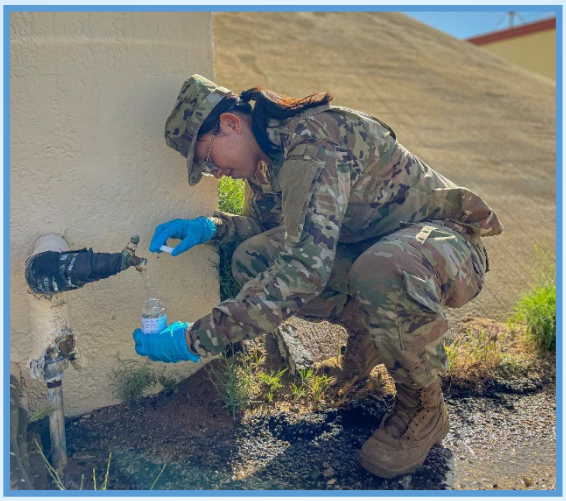
EAFB receives a majority of our water supply from the Antelope Valley East Kern (AVEK) Water Agency. The water received from the AVEK is supplied to EAFB in finished drinking water quality form. The AVEK supply is primarily from the California aqueduct, a surface water source that currently has 12 Wells as of 2018. AVEK's alternative supply is State Water Project water, which has been stored in the aquifer at various underground storage facilities (i.e. "water banks"). This water is extracted as local groundwater for water quality purposes or as supply during drought. As a water wholesaler, the AVEK Water Agency published their 2022 Water Quality Report earlier this year, which is located at https://www.avek.org/2022-annual-water-quality-report-kern-county-system

Additionally, water provided from AVEK is mixed with water supplied from on-base wells. In 2022, groundwater was supplied from two installation wells. One was used in combination with the AVEK supply to feed the main drinking water distribution system. The other well was used to feed a small section of the West Base area. All wells are located within the base boundaries, primarily near South and West Base areas. These wells are fed by the Antelope Valley Aquifer.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo o hable con alguien que lo entienda bien.

Treatment Process

Our water is treated with chlorine, which is a disinfectant that kills dangerous bacteria and other microorganisms that may be in the water. The 412th Civil Engineering Squadron monitors the disinfectant levels on a daily basis.



Pictured above: A technician from the 412th Operational Medical Readiness Squadron, Bioenvironmental Engineering Flight, conducting routine water testing at locations spanning the water distribution system. Water samples are collected, tested by a certified laboratory, and results are submitted to the State Water Resources Control Board to demonstrate compliance with all requirements and regulations.

Source Water Assessment

The 412th Civil Engineering (CE) Squadron completed our Source Water Assessment on 18 June 2003 and it is on file in the CE Water & Gas office (661-277-5000). This assessment looks at possible contamination sources that may affect the base water supply. Possible contaminating activities for the wells surveyed in this assessment include nearby abandoned wells, storm drainage discharge, above ground water storage tanks, and nearby roads. The health risks from these activities are diminished through weekly monitoring of the potable water system.

AVEK also maintains a Source Water Assessment for the water they distribute. This is a federal requirement, and lists the Physical Barrier Effectiveness, Inventory of Possible Contaminating Activities, Vulnerability Ranking, Assessment Map, Assessment Summary, and Public Notification procedures. A copy of these assessments may be viewed at Antelope Valley-East Kern Water Agency, 6500 West Avenue N, Palmdale, CA 93551.

What Is In Drinking Water?

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 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 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 can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- Microbial contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- Pesticides and herbicides, that may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems.
- Radioactive contaminants, that can be naturally-occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the State Water Resources Control Board (State Board) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The State Board regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Consumption Note for Susceptible Individuals

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. USEPA/Centers for Disease Control (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).

Water Quality Data Table

All sources of drinking water contain some naturally occurring contaminants. At low levels, these substances are generally not harmful in our drinking water. Removing all contaminants would be extremely expensive, and in most cases, would not provide increased protection of public health. Additionally, some naturally occurring minerals provide benefits by improving the taste of drinking water and providing nutritional value at low levels.

To ensure that tap water is safe to drink, the USEPA prescribes regulations which limit the concentration of contaminants in water provided by public water systems. The tables on the following pages list all the drinking water contaminants that were detected during the 2022 calendar year of this report or are the most recent detected level within the past 9 years. Many more contaminants were tested than listed on the following tables; but we only report those that were detected in our water with the exception of Lead. Lead level is required regardless of whether it is detected. The USEPA and state allow us to monitor for some contaminants less than once per year because the concentrations of these contaminants do not change frequently, or because the system is not considered vulnerable to this type of contamination. As such, some of our data, though representative, is more than one year old.

In these tables you may find terms and abbreviations that might not be familiar to you. To help you better understand these terms, we have provided their definitions below.

Important Terms Used

Term	Definition
AL	Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
LRAA	Locational Running Annual Average: Annual running average at a single sampling site.
HAA5	Sum of Five Regulated HAAs, i.e., Monochloroacetic Acid, Monobromoacetic Acid, Dichloroacetic Acid, Dibromoacetic Acid, and Trichloroacetic Acid
MCL	Maximum Contaminant Level: The highest concentration of a contaminant that is allowed in drinking water. Primary MCLs are enforceable and are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.
MCLG	Maximum Contaminant Level Goal: The concentration of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable. They are set by the U.S. Environmental Protection Agency.
mg/L	Mg/L: Milligrams per Liter (ppm)
N/A	Not Applicable
ND	Not Detected
pCi/L	pCi/L: picocuries per liter (a measure of radioactivity)
PDWS	Primary Drinking Water Standards: MCLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.
PHG	Public Health Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.
ppb	ppb: parts per billion, or micrograms per liter (µg/L)
ppm	ppm: parts per million, or milligrams per liter (mg/L)
SDWS	Secondary Drinking Water Standards: MCLs for contaminants that affect taste, odor, or appearance of the drinking water. Contaminants with SDWSs do not affect the health at the MCL levels.
TTHM	Total Trihalomethanes, or Sum of Four Regulated THMs, *i.e.*, Chloroform, Bromodichloromethane, Dibromochloromethane, and Bromoform
µs/cm	µs/cm: micro Siemens per centimeter (a measure of conductivity of a solution)
µg/L	µ/L: Micrograms per Liter (ppb)

Water Quality Data Table

Contaminant	MCL	AVEK[1]	EAFB Wells	Distribution System[2]	Months in Violation	Major Sources in Drinking Water
Microbiological Contaminants (PDWS)[3]						
Total Coliform	5% positive or 2 consecutive positive samples	0	0	3	0	Naturally present in the environment
E. coli	1 positive sample	0	0	0	0	Human or animal fecal waste

Contaminant	MCL	PHG	AVEK Plant Average[1]	AVEK Wells Average[1]	EAFB Wells Average	EAFB Well Range	Blended Average Range[4]	West Base Average[5]	Sample Date	Violation	Major Sources in Drinking Water
Arsenic (PDWS)											
Arsenic (µg/L)	10	0.004	3.6	5.2	7.64	2.0-16	2.7-8.7	1.73	2022	No	Erosion of natural deposits; runoff from orchards; glass and electronics production wastes

Contaminant	MCL	PHG	AVEK Plant Average	AVEK Wells Average	EAFB Average	EAFB Well Range	West Base Well Average	Sample Date	Violation	Major Sources in Drinking Water
Inorganic Compound (PDWS)										
Aluminum (µg/L)	1000	600	130	ND	ND	ND	ND	2022	No	Erosion of natural deposits; residue from some surface water treatment processes
Barium	1000	2000	58	ND	ND	ND	31	2022	No	Discharges of oil drilling wastes and from metal refineries; erosion of natural deposits
Total Chromium (µg/L)	10	MCLG = 100	5.1	ND	5.16	ND-31	ND	2022	No	Discharge from steel and pulp mills and chrome plating; erosion of natural deposits
Hexavalent Chromium[6] (µg/L)	10	0.02	5.8	2.9	6.07	ND	ND	2021	No	Discharge from electroplating factories, leather tanneries, wood preservation, chemical synthesis, refractory production, and textile manufacturing facilities; erosion of natural deposits
Fluoride (mg/L)	2	1	0.28	0.15	0.32	0.3-0.76	0.76	2022	No	Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories
Nitrate (mg/L)	10	10	2.5	2.6	0.2	ND-0.95	0.95	2022	**Yes[7]**	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits

1. AVEK data, including AVEK Plant Average and AVEK Wells Average, were obtainted from 2022 & 2021 Kern County Annual Water Quality Report. Some contaminants are not required to be tested every year, thus these data were obtained from 2021 report.
2. Distribution System refers to sampling that are taken at final point of delivery to end user through out the base.
3. In 2022, we have 3 total samples that tested positive for bacteria. These samples were taken in July, September and October. Repeat sampling concluded that the results were indicated as negative, no sites which initially tested positive for total coliform bacteria tested positive for E.coli bacteria thus they are not considered as violations. Our assessment indicates that weather conditions like extensive rainfall, stagnant water or error in sampling protocol may have affected the sampling results.
4. Blended water is the water delivered to the end user. Because of the high levels of arsenic in the wells, EAFB is on an approved plan by the State Water Resources Control Board to bland with AVEK water. The blending ratio fluctuate seasonally, however in recent years AVEK water has been most of the water used. Water quality complance is reported based on blended water results.
5. Water provided to area around West Base is supply by a different source from the rest of Main Base, thus we have separate those sampling data to better represent West Base water quality.
6. There is currently no MCL or sampling requirement for hexavalent chromium. The previous MCL of 0.010 mg/L (10 ppb) was withdrawn on September 11, 2017. Our last sampling of hexavalent chromium was from 2014.
7. Nitrate sampling is required every year at the water source. In 2022 we sampled five out of six wells, results ranging from ND to 0.95 mg/L. However, we failed to sample for Nitrate at one well, resulting in a citation and a Tier 3 violation.

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Water Quality Data Table Continue

Contaminant	MCL	PHG	AVEK Plant Average	AVEK Wells Average	EAFB Average	EAFB Range	West Base Average	Sample Date	Violation	Major Sources in Drinking Water
Disinfectants & Disinfection By Products[8] (PDWS)										
Total Trihalomethanes (µg/L)	LRAA: 80		20	NA	#29.8	#17-43.25	NA	2022	No	Byproduct of drinking water disinfection
Haloacetic Acids (µg/L)	LRAA: 60		2.1	NA	#3.9	#1.55-4.6	NA	2022	No	Byproduct of drinking water disinfection
Lead and Copper[9] (PDWS)										
Lead (µg/L)	AL=90% of bldgs. <15	0.2	ND	ND	ND	10 sites sampled; 0 sites over AL	N/A	2021	No	Internal corrosion of household water plumbing systems; discharges from industrial manufacturers; erosion of natural deposits
Copper (mg/L)	AL=90% of bldgs. <1.3	0.3	ND	ND	0.1	10 sites sampled; 0 sites over AL	N/A	2021	No	Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Radioactive Contaminants (PDWS)										
Gross Alpha (pCi/L)	15	0.2	N/A	5.3	ND	**ND**	ND	2022	No	Erosion of natural deposits
Combined Uranium (pCi/L)	20	0.3	3.5	N/A	ND	ND	ND	2022	No	Erosion of natural deposits
Tritium (pCi/L)	20000	400	N/A	5.9	ND	ND	ND	2022	No	Decay of natural and man-made deposits
Contaminant	**Secondary MCL[10]**		**AVEK Plant Average**	**AVEK Wells Average**	**EAFB Average**	**EAFB Well Range**	**West Base Well Average**	**Sample Date**	**Violation**	**Major Sources in Drinking Water**
Secondary Standard Contaminants (SDWS)										
Alkalinity Bicarbonate (mg/L)	N/A		50	ND	123	110-140	140	2022	No	Erosion of minerals and natural carbonate deposits
Calcium (mg/L)	N/A		74	70	30.5	18-67	31	2022	No	Leaching from natural deposits
Chloride (mg/L)	250		47	5	49.9	5.4-180	72	2022	No	Runoff/leaching from natural deposits; seawater influence
Hardness Total as CaCO3 (mg/L)	N/A		140	220	88	54-180	94	2022	No	The sun of polyvalent cations present int eh water, generally naturally occuring magnesium and calcium
Iron (µg/L)	300		ND	135	125	ND-260	150	2022	No	Leaching from natural deposits; industrial wastes
Magenesium (mg/L)	N/A		8.3	8.5	2.6	1.8-3.7	3.6	2022	No	Erosion of minerals and natural deposits
Manganese (µg/L)	50		ND	ND	2.1	ND-13	ND	2022	No	Erosion of minerals and natural deposits; steel production and mining.
Sodium (mg/L)	N/A		15	43	82.2	42-140	120	2022	No	Leaching from natural deposits
Specific Conductance (µs/cm)	1		500	650	523	320-960	730	2022	No	Substances that form ions when in water; seawater influence
Sulfate (mg/L)	500		53	56	82	53-140	140	2022	No	Runoff/leaching from natural deposits; industrial wastes
TDS (m/L)	1000		290	390	336.6	200-590	490	2022	No	Runoff/leaching from natural deposits; industrial wastes

8. Disinfection Byproduct (DBPs), which includes Trihalomethanes and Haloacetic Acids. They are formed when disinfectant like chlorine is used to control microbial pathogens combine with naturally occurring materials found in source water. #. Indicating the LRAA at sampling locations.

9. Lead and Copper is regulated by ensuring the 90th percentile of sample result in under the AL. In this case, all of our test for Lead came back as ND but we are still require to report them. Sampling is conducted every 3 years. The most recent samples are from August 2021. High Priority Tap were sampled at Desert High School in 2022 with no Lead detected.

10. Secondary MCLs do not have PHGs or MCLGs because secondary MCLs are set to protect the aesthetics of water and PHGs and MCLGs are based on health concerns.

Additional Information Regarding Nitrate

We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During the calendar year 2022, we did not monitor for nitrate from Well S-10; therefore, cannot be sure of the quality of your drinking water during that time.

Nitrates can be found in drinking water supplies. Their presence in groundwater is generally associated with septic systems, confined animal feeding operations or fertilizer use. These sources of nitrate contamination are more associated with rural settings and are often subjects of drinking water source protection programs.

Additional Information Regarding Total Coliforms

Coliforms are bacteria that are naturally present in the environment and are used as an indicator the other, potentially-harmful bacteria may be present. If coliforms were found in more samples than allowed, this is a warning of potential problems.

Additional Information Regarding Fecal Coliform and E. coli

Fecal coliform and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms.

Common Water Quality Observations

The 412th Bioenvironmental Engineering Flight and 412th Civil Engineering Squadron make every effort to ensure the water provided to EAFB is safe for consumption and the installation is notified should water quality deteriorate.

Some locations may experience brown or rusty water coming from their faucets; more often in older buildings or houses. This is usually caused by a higher concentration of minerals in the water. This does not mean that the water is not safe. Any brown or rusty water that does not run clear after running faucets for several minutes should be reported to housing or facility maintenance.

Another common occurrence is white cloudy water. This is due to more oxygen in the water and most often noticed during colder months. Any cloudy water that does not clear up after sitting for a couple minutes should be reported to facility or housing maintenance.

Additional Information Regarding 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. 412th Bioenvironmental Engineering Flight and 412th Civil Engineering Squadron are 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 do so, you may wish to collect the flushed water and reuse it for another beneficial purpose, such as watering plants. 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 (800-426-4791) or at http://www.epa.gov/lead.

In addition to the 30 housing sites sampled for lead in 2021, the Bioenvironmental Engineering flight sampled the Edwards AFB's Child Development Center and School Age Program in 2006. All water fixtures where sampled, and all samples met federal limits. In June and July of 2016, additional sampling was conducted for new water fixtures; again all samples met federal limits.

Additional Information Regarding Fluoride

The EAFB and AVEK water systems contain naturally occurring fluoride. Neither EAFB nor AVEK add additional fluoride to the water system due to State requirements and the scope/size of the EAFB water distribution system. The natural level of fluoride present in the water system is below the maximum contamination limit (MCL) of 2.0 parts per million (ppm).

In 2015, the U.S. Department of Health and Human Services released a Public Health Service recommendation of 0.7 ppm as the optimal fluoride level in drinking water to prevent tooth decay. Your local dentist or pediatrician can prescribe daily fluoride brushing, tablets, or drops for you and your children to ensure you receive enough fluoride.

Tips for Protecting Your Water

- Eliminate excess use of lawn and garden fertilizers and pesticides – they contain hazardous chemicals that can reach your drinking water source.
- Pick up after your pets.
- Dispose of chemicals properly; take used motor oil to a recycling center.

Additional Information Regarding Arsenic

While your drinking water meets federal and state standard for arsenic, it does contain low levels of arsenic. The arsenic standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. The U.S. Environmental Protection Agency continues to research the health effects of low levels of arsenic which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

For more information regarding this report, please contact either:

- 412th Operational Medical Readiness Squadron – Bioenvironmental Engineering Flight (661-277-3272)
- 412th Test Wing – Public Affairs (661-277-1454)