



Edwards Air Force Base California



2020 Water Quality Report

2020 Monitoring Results for Edwards AFB – Main Base (Public Water System ID: 1510701)
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, as in years past, **our tap water met or exceeded all U.S. Environmental Protection Agency (USEPA) and state drinking water health requirements.**

Through regular monitoring, any contaminants 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 ground water 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 2020 Water Quality Report earlier this year, which is located at <https://www.avek.org/2020-annual-water-quality-report-kern-county-system>.

Additionally, water provided from AVEK is mixed with water supplied from on-base wells. In 2020, groundwater was supplied from three installation wells. 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: Technicians 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.

In order to ensure that tap water is safe to drink, the USEPA prescribes regulations which limit the amount of contaminants in water provided by public water systems. The tables on the following pages list all of the drinking water contaminants that were detected during the 2020 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 table; only those substances listed below were detected in our water. The State does not require annual sampling of some contaminants because the concentrations of these contaminants do not change frequently. As such, some of our data is more than one year old but is still representative and the most recent result.

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.
MCL	Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. Primary MCLs 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 level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.
MFL	MFL: million fibers per liter, used to measure asbestos concentration
mg/L	Mg/L: Milligrams per Liter
MRDL	Maximum residual disinfectant level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MRDLG	Maximum residual disinfection level goal. 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 contaminants.
N/A	Not Applicable
ND	Not Detected
pCi/L	pCi/L: picocuries per liter (a measure of radioactivity)
PDWS	Primary Drinking Water Standards: MCLs and MRDLs 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 ($\mu\text{g/L}$)
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.
$\mu\text{s/cm}$	$\mu\text{s/cm}$: micro Siemens per centimeter (a measure of conductivity of a solution)
ug/L	ug/L: Micrograms per Liter



Water Quality Data Table

Contaminant	MCL	PHG	AVEK Plant Average ¹	AVEK Wells Average ²	EAFB Well Average	EAFB Well Range	EAFB Blended Water Range ³	EAFB Blended Water Average	Sample Date	Violation	Major Sources in Drinking Water
Inorganic Contaminants (PDWS)											
Aluminum (mg/L)	1	0.6	0.096	ND	ND	ND	NA	NA	2018	No	Erosion of natural deposits; residue from some surface water treatment processes
Arsenic (µg/L)	10	0.004	3.8	4.9	12.35#	2 – 16 ³	2-10	6.09	2020	No	Erosion of natural deposits; runoff from orchards; glass and electronics production wastes
Barium (mg/L)	1	2	ND	NA	0.01803	ND - 0.030	NA	NA	2018	No	Discharges of oil drilling wastes and from metal refineries; erosion of natural deposits
Total Chromium (ug/L)	50	MCLG=100	ND	ND	5.23	2.3 – 8.7	NA	NA	2018	No	Discharge from steel and pulp mills and chrome plating; erosion of natural deposits
Hexavalent Chromium (ppb)	10 ⁴	0.02	0.096	3.2	3.57	ND – 6.07	NA	NA	2014	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	0.33	NA	0.7	0.32 – 1.5	NA	NA	2020	No	Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories
Selenium (µg/L)	50	30	2.7	3.3	5	5	NA	NA	2018	No	Discharge from petroleum, glass, and metal refineries; erosion of natural deposits; discharge from mines and chemical manufacturers; runoff from livestock lots (feed additive)
Nitrate (as N) (mg/L)	10	10	3.0	3.4	0.77	0.4 – 1.5	NA	NA	2020	No	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits
Lead (µg/L)	AL=90% of homes <15	0.2	ND	ND	ND	30 sites sampled; 0 sites over AL	NA	NA	2018 ⁵	No	Internal corrosion of household water plumbing systems; discharges from industrial manufacturers; erosion of natural deposits
Copper (mg/L)	AL=90% of homes <1.3	0.3	N/A	N/A	0.155	30 sites sampled; 0 sites over AL	NA	NA	2018 ⁵	No	Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Radioactive Contaminants (PDWS)											
Gross Alpha (pCi/L)	15	MCLG=0	1.7	1.2	6.12	ND – 10.1	NA	NA	2018	No	Erosion of natural deposits
Uranium (pCi/L)	20	0.43	6.3	5.0	5.21	2.57– 5.21	NA	NA	2018	No	Erosion of natural deposits
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Water Quality Data Table

Contaminant	Secondary MCL ⁶	PHG	AVEK Plant Average	AVEK Wells Average	EAFB Well Average	EAFB Well Range	EAFB Blended Water Range	EAFB Blended Water Average	Sample Date	Violation	Major Sources in Drinking Water
Secondary Standard Contaminants (SDWS)											
Calcium (mg/L)	N/A	N/A	86	46	28.33	17 – 46	NA	NA	2018	No	Leaching from natural deposits
Chloride (mg/L)	500	N/A	96	56	53.93	4.8 – 120	NA	NA	2018	No	Runoff/leaching from natural deposits; seawater influence
Color (units)	15	N/A	<5	<5	ND	ND	NA	NA	2018	No	Naturally-occurring organic materials
Hardness (mg/L)	N/A	N/A	ND	110	82	50 – 130	NA	NA	2018	No	The sum of polyvalent cations present in the water, generally naturally occurring magnesium and calcium
Iron (mg/L)	0.3	N/A	ND	ND	0.399	0.1-0.75	NA	NA	2020	No	Leaching from natural deposits; industrial wastes
Sodium (mg/L)	N/A	N/A	46	49	95	49 – 170	NA	NA	2018	No	Leaching from natural deposits
Specific Conductance (µs/cm)	1600	N/A	600	760	626.67	340 – 1000	NA	NA	2018	No	Substances that form ions when in water; seawater influence
Sulfate (mg/L)	500	N/A	75	57	111.67	54 – 200	NA	NA	2018	No	Runoff/leaching from natural deposits; industrial wastes
Total Dissolved Solids (mg/L)	1000	N/A	490	310	406.67	230 - 640	NA	NA	2018	No	Runoff/leaching from natural deposits
Turbidity (units)	5	N/A	0.05	0.06	0.63	0.23-1.4	NA	NA	2018	No	Soil runoff
Zinc (ug/L)	5000	N/A	ND	ND	ND	ND	NA	NA	2018	No	Runoff/leaching from natural deposits; industrial wastes
Disinfectants & Disinfection By Products (PDWS)											
Total Trihalomethanes (µg/L)	80	N/A	24#	NA	NA	NA	19 – 120 ⁷	67#	2020	No	Byproduct of drinking water disinfection
Haloacetic Acids (µg/L)	60	N/A	3.7#	NA	NA	NA	2.1-4.3	5.45#	2020	No	Byproduct of drinking water disinfection
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1. AVEK Plant Average data obtained from previous Kern County Annual Water Quality Reports
2. AVEK Wells Average data obtained from 2020 Annual Water Quality Report – Kern County
3. 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 blend with AVEK water. The blending ratio is roughly 4:1 AVEK influent: EAFB Well. Please note that the raw well water shows arsenic levels above the MCL, but the drinking water **is in compliance** based on this approved blending plan.
 - a. Water quality compliance is reported based on blended water results.
4. There is currently no MCL for hexavalent chromium. The previous MCL of 0.010 mg/L (10 ppb) was withdrawn on September 11, 2017
5. Lead and Copper sampling is conducted every 3 years. The most recent samples are from August 2018. No schools requested lead or copper sampling in 2020.
6. 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.
7. Disinfection Byproduct (DBPs), which includes Trihalomethanes and Haloacetic Acids, detections increased most likely due to a lack of usage during the COVID-19 Pandemic. Quarter 3 and Quarter 4 resulted in elevated levels above the MCL of 80 µg/L with 120 µg/L and 83 µg/L respectively. However, there was no violation given the consecutive averages of the four quarters is below the 80 µg/L. Two additional sites were added to the sampling schedule for monitoring purposes, approved by the State Water Resources Control Board on December 10, 2020.

This value represents the location with the highest average contaminant of all the sampling locations known as the locational running annual average.

Water Quality Data Table

Contaminant	MCL	MCLG	Total Positive Samples	Range	Sample Date	Violation	Major Sources in Drinking Water
Microbiological Contaminants (PDWS)							
Total Coliform Bacteria (in the distribution system)	1 positive monthly sample	0	1	ND – 1 ⁸	2020	No	Naturally present in the environment
Fecal Indicator <i>E. coli</i> (at the groundwater source)	0	0	3	ND – 3 ⁹	2020	No	Human or animal fecal waste

8. One sample on October 28, 2020 tested positive for total coliform initially. Repeat sampling concluded that no sites which initially tested positive for total coliform bacteria tested positive for *E.coli* bacteria. Our assessment indicates that weather conditions like extensive rainfall, stagnant water or error in sampling protocol may have affected the sampling results. After re-sampling, the results were indicated as negative.
9. On October 7, 2020, we sampled the groundwater sources for the fecal-indicator, *E. coli*. We were notified on October 8, 2020 that one of the wells tested positive for *E. coli*. On October 8, we took two additional samples, and the well was immediately taken offline. We were notified on October 9 that both of the samples were positive for *E. coli*. No violation occurred because the well was taken offline immediately and was not detected in the distribution system. Corrective actions were taken by the 412th Civil Engineering Squadron, and on October 14, 2020, five additional samples were taken. On October 15, we were informed that one of the five tests had come back positive for total coliform, but not *E. coli*. At this time, another round of remediation efforts were conducted by the 412th Civil Engineering Squadron after which another five samples were taken. All results from the second round of five tests were negative for both total coliform and fecal indicator *E. coli*. Two additional samples were performed on October 28, and both samples were negative. Beginning November 4, weekly monitoring samples were taken. On December 4, 2020, the State Water Resources Control Board granted the well be brought back online with continued weekly monitoring efforts. From November 4 to the end of the year of 2020, all samples were negative. Our system is in contact with the State Water Resources Control Board, and we have a State Water Board-approved plan to continue monitoring on a weekly basis. For the time period that the well was offline, water feeding the distribution system came from Antelope Valley Eastern Kern Water Agency.

Additional Information Regarding Total Coliforms

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

Additional Information Regarding Fecal Coliform and *E. coli*

Fecal coliforms 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. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

Additional Information for Water Quality in Low-Use Buildings due to COVID-19

Please view the following links for information on how to ensure good water quality in buildings that may have a lack of usage due to the COVID-19 Pandemic. 412th Civil Engineering ensures the distribution system of EAFB is flushed and pulling fresh water.
<https://www.epa.gov/coronavirus/information-maintaining-or-restoring-water-quality-buildings-low-or-no-use>

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 2018, 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 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.

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.



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 (661-277-3510)

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.