CAMP LEMONNIER, DJIBOUTI

2015 DRINKING WATER CONSUMER CONFIDENCE REPORT

Is our water safe to drink?

The Camp Lemonnier drinking water system continues to provide water that is safe and Fit for Human Consumption (potable), as determined by the Camp Lemonnier Commanding Officer's Record of Decision dated 05 November 2013 and currently sustained. We are proud to support the Navy's commitment to provide safe and reliable drinking water to our service members and their families. This annual Consumer Confidence Report includes both general and mandatory information to educate everyone about our water source(s), treatment processes, standard requirements, and other details to help assure you that our water is safe to drink.

Our drinking water fully complies with the safe drinking water criteria specified in the DoD Overseas Environmental Baseline Guidance Document (OEBGD), which is derived from the U.S. Environmental Protection Agency (EPA) drinking water standards. When the OEBGD and U.S. standards differ, the *most protective* requirement is adopted. A detailed list of constituents found in our drinking water is included in this report, along with a comparison to the maximum levels considered safe for the general public by these standards.

Where does our water come from and how is it treated?

The Camp Lemonnier water supply is provided by groundwater pumped from aquifers underlying the Camp through wells located on site. An aquifer is a body of sub-surface saturated rock that is both permeable and porous allowing water to easily move through it. Groundwater has to squeeze through pore spaces of rock and sediment to move through an aquifer. Because it takes effort to force water through tiny pores, ground water loses energy as it flows, leading to a decrease in hydraulic head, or liquid pressure, in the direction of flow. Larger pore spaces usually have higher permeability (the measure of ease water can move through a porous rock), produce less energy loss, and therefore allow water to move more rapidly. There are two aquifers underlying Camp Lemonnier: a shallow (15-meter to 49-meter thick) unconsolidated aquifer with total dissolved solids (TDS) concentrations less than 10,000 mg/L, which receives water recharge from the surface water of the Wadi Ambouli located immediately west of Camp, and a deeper aquifer with TDS near 35,000 mg/L.

The amount of water in storage in an aquifer is reflected by the elevation of its water table and can vary from season to season and year to year. Water will eventually discharge or leave an aquifer and must be replaced by new water to replenish or recharge the aquifer. Currently, there are three drinking water wells at Camp Lemonnier and the groundwater pumped from these wells is piped to an on-site treatment plant, which uses a variety of chemicals and membranes to filter and purify water for consumption.

The treatment process at Camp Lemonnier consists of several different technologies: filtration, ultraviolet (UV) disinfection, reverse osmosis (RO) and chemical disinfection. The treatment plant, which is called a Reverse Osmosis Water Purification Unit (ROWPU), consists of eight multimedia filters, eight granular activated carbon filters, eight cartridge filters and four parallel RO treatment trains.

All four RO water treatment trains are identical. Water from three groundwater wells is processed through the granular multimedia pressure filters to remove large particulate matter. From there, water passes through the granular activated carbon (GAC) adsorption pressure filters to remove dissolved contaminants, as well as the cartridge pressure filters to remove small particles. The filtered water is then pH adjusted with hydrochloric acid, which is then sent through a UV light disinfection unit to kill any remaining microbes that might have passed through the multiple filtration steps before entering the RO unit.

In reverse osmosis treatment units, pressure is continuously applied to push the water molecules across the membrane from an area of higher concentration (less water molecules, more contaminants) to lower concentration (more water molecules, less contaminants). The RO skid removes unwanted salts, microorganisms, and other contaminants. After the RO treatment, the drinking water is pH adjusted with sodium hypochlorite and disinfected with calcium hypochlorite in order to maintain a chlorine residual in the distribution system.

Hard water contains dissolved minerals including calcium and magnesium. Because our treatment process eliminates a considerable amount of these minerals during processing, our water is considered soft water. The minerals in water provide its characteristic taste. Soap lathers less in hard water. The characteristics of soft water, e.g. a "flat" taste and lots of lather during washing, are not associated with poor quality water, just very pure water.

Why are there contaminants in drinking water?

Drinking water, including bottled water, may reasonably be expected to contain small amounts of some contaminants. 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 contaminants. However, the porosity, i.e. the measure of the amount of open space between grains or within cracks or cavities of the rock, of aquifers makes them good filters for natural purification of the groundwater. Like a coffee filter, the pore spaces in an aquifer purify groundwater of particulate matter (the coffee grounds), but not of dissolved substances (the coffee). Also, like any filter, if the pore sizes are too large, smaller particles can get through.

An aquifer can be contaminated by many things we do at and near the surface of the earth. Contaminants reach the water table by any natural or manmade pathway along which water can flow from the surface to the aquifer. Clay particles in an aquifer can trap dissolved substances that percolate through the soil. Further, rocks and minerals of an aquifer can contribute high concentrations of certain elements.

Due to this, some contaminants may be present in source drinking water, such as:

- **Microbial contaminants**, such as viruses and bacteria, that may come from wildlife, sewage treatment plants, septic systems, and livestock;
- **Disinfection by-products,** such as chlorine and chloramine used to remove pathogens from the water;
- **Pesticides and herbicides**, which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses;
- **Inorganic contaminants**, naturally occurring 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;
- **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; and
- **Radioactive contaminants**, which can be naturally occurring or be the result of oil and gas production and mining activities.

The presence of contaminants does not necessarily indicate that water poses a health risk. In order to ensure that tap water is safe to drink, regulations limit the amount of certain contaminants in water provided by public water systems. Regular sampling is conducted to detect the level of contaminants in the water system. If the results are above regulatory levels,

you will be notified by email and Public Notification. You can learn more about contaminants and any potential health effects by visiting the EPA's Drinking Water Standards website: http://permanent.access.gpo.gov/lps21800/www.epa.gov/safewater/standards.html

Source Water Assessment

In September 2014, the Naval Facilities Engineering Command (NAVFAC) conducted a comprehensive sanitary survey of the Camp Lemonnier drinking water system. This survey provided an evaluation of the adequacy of the drinking water source, facilities, equipment, operation and maintenance for producing and distributing safe drinking water. NAVFAC is continually improving the drinking water system based on the recommendations in the report.

Some people must use special precautions

There are people who may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons, such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/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 EPA's Safe Drinking Water website http://www.epa.gov/safewater.

Additional Information for 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. The Camp Lemonnier, Public Works Department (PWD) is responsible for providing high-quality drinking water and has direct control over the materials used in plumbing components on the facility. This ensures that no lead service lines or components are used on the drinking water system. As a general safety practice, whenever - and wherever - you plan to use tap water for drinking or cooking, you can minimize the potential for lead exposure by flushing the tap for 30 seconds to 2 minutes prior to use, if it is known that the water from that specific tap has not been used for an extended period of time; as water conservation is an equally important issue at Camp Lemonnier. Information on lead in drinking water and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water website: www.epa.gov/safewater/lead.

Water Quality Data Table

The table below lists all of the drinking water contaminants and relevant highest sampling data results collected during the 2015 calendar year (unless otherwise noted). The presence of contaminants in the water does not necessarily indicate that the water poses a health risk. All contaminants detected in Camp Lemonnier drinking water are below the Maximum Contaminant Levels (MCLs) allowed by FGS, DoD, and EPA applicable requirements.

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Contaminant	Units	MCL	MCLG	Highest Result	Testing Frequency	Violation	Typical Source
Inorganic Components							
Boron	mg/L	-	5	0.56	Annually	NO	Erosion of natural deposits; leaching
Chlorides	mg/L	-	250	67	Annually	NO	Erosion of natural deposits; leaching
Copper	mg/L	1.3	-	0.012	Annually	NO	Corrosion of plumbing systems; erosion of natural deposits
Iron	mg/L	-	0.3	0.02	Annually	NO	Erosion of natural deposits; leaching
Lead	mg/L	0.015	-	0.0011	Annually	NO	Corrosion of plumbing systems; erosion of natural deposits
Nitrates (Total)	mg/L	10	-	1.6	Annually	NO	Runoff from fertilizer use, leaching from septic tanks, sewage, erosion of natural deposits
Sulfate	mg/L	-	250	22	Annually	NO	Erosion of natural deposits; leaching
Total Dissolved Solids	mg/L	-	500	157	Annually	NO	Erosion of natural deposits
Total Trihalomethanes	mg/L	0.08	-	0.007	Annually	NO	By-product of drinking water disinfection
Zinc	mg/L	-	5	0.009	Annually	NO	Erosion of natural deposits; leaching
Radionuclides							
Gross Alpha	pCi/L	15	-	0.098	Every 4 years	NO	Erosion of natural deposits
Gross Beta	mrem /yr	4	-	0.072	Every 4 years	NO	Decay of natural and man-made deposits
Radium-226	pCi/L	5	-	0.91	Every 4 years	NO	Erosion of natural deposits
Radium-228	pCi/L	5	-	0.928	Every 4 years	NO	Erosion of natural deposits
Total Uranium	pCi/L	30	-	1.16	Every 4 years	NO	Erosion of natural deposits
Note: All other Inorganic Compounds, Organic Compounds, Pesticides, PCBs and Total Coliforms were not detected.							

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Unit Descriptions	
Unit	**Definition**
mg/L	milligrams per liter
mrem/yr	millirem per year (a unit of absorbed radiation dose)
ppm	parts per million, or milligrams per liter (mg/L)
ppb	parts per billion, or micrograms per liter (µg/L)
pCi/L	picocuries per liter (a measure of radioactivity)
PQL	Practical Quantitation Limit of the best method
NA	not applicable
ND	Not detected, i.e. below PQL
NR	Monitoring not required, but recommended.

Important Terms	
Term	**Definition**
AL	Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements.
MCL	Maximum Contaminant Level: 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.
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 allow for a margin of safety.
MNR	Monitored Not Regulated
MPL	State Assigned Maximum Permissible Level
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
TT	Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.
Variances and Exemptions	Variances and Exemptions: EPA permission not to meet an MCL or a treatment technique under certain conditions.

Violation(s) or Exceedance(s)

No drinking water quality violations or exceedances occurred during 2015.

Points of Contact

If you have any questions regarding this report or about the drinking water processes, please contact any of the following Installation Water Quality Board (IWQB) members below:

Public Works Officer
Camp Lemonnier
DSN: 311-824-4064

Installation Environmental Program Director
Camp Lemonnier
DSN: 311-824-5523

Environmental Health Officer/Industrial Hygiene Officer
Camp Lemonnier EMF
DSN: 311-824-4910