# CAMP LEMONNIER, DJIBOUTI

# 2014 DRINKING WATER CONSUMER CONFIDENCE REPORT

## Is our water safe to drink?

Camp Lemonnier's drinking water system provides water that is safe and Fit For Human Consumption (potable) as determined by the Installation Commanding Officer's Record of Decision dated 05 November 2013. 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 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 drinking water criteria specified in the DoD's Overseas Environmental Baseline Guidance Document (OEBGD), which is derived from the U.S. DoD Overseas Environmental Baseline Guidance Document (OEBGD), U.S. Environmental Protection Agency (EPA) drinking water standards. When Djibouti 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/liter, which receives freshwater recharge from the surface water of the Wadi Ambouli located immediately west of Camp, and a deeper consolidated aquifer.

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. But no matter how fast or slow, water will eventually discharge or leave an aquifer and must be replaced by new water to replenish or recharge the aquifer. If the rate of recharge is less than the natural discharge rate plus well production, the water table will decline and the aquifer's storage will decrease. Currently, there are three drinking water wells at Camp Lemonnier. If water is pumped from a well faster than it is replenished, the water table is lowered and the well may go dry. Groundwater pumped from Camp Lemonnier 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.

Each treatment train is identical and is designed to produce 100,000 gallons of drinking water per day or a total of 400,000 gallons of drinking water per day for the entire ROWPU. Water from three groundwater wells is processed through the granular multimedia pressure filters to remove large particulate matter. From there it 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 then passes through a UV light disinfection unit to kill any 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 lower concentration (less water molecules, more contaminants) to higher concentration (more water molecules, less contaminants). The RO skid removes unwanted salts, microorganisms, and other contaminants. After the RO treatment, the drinking water is 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 web site at 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 at 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. Camp Lemonnier's 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. Information on lead in drinking water and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water website at www.epa.gov/safewater/lead.

## Additional Information for Iron

Iron is regulated as a secondary contaminant by USEPA, because it may cause discolored water or aesthetic effects in drinking water, such as unpleasant odor or taste. Exceeding a secondary standard may cause people to stop using the water even though the water is actually safe to drink. Secondary standards are set to provide public water systems guidance on removing these chemicals to levels that are below what most people will find noticeable. Activities taken to reduce the iron concentration in drinking water include flushing the distribution system to remove settled particulates. Information on iron in drinking water and the steps you can take to minimize exposure is available from the USEPA Safe Drinking Water website at www.epa.gov/safewater/sdwa.

## Water Quality Data Table

The table below lists all of the drinking water contaminants and relevant sampling data collected during the 2014 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's drinking water are below the Maximum Contaminant Levels (MCLs) allowed by FGS, DoD, and EPA applicable requirements..

| Contaminant | MCLG or MRDLG | MCL, TT, or MRDL | Your Water | Units | Sample Date | Violation | Typical Source |
|---|---|---|---|---|---|---|---|
| **Inorganic Components** | | | | | | | |
| Sodium | N/A | N/A | 42.0 | mg/l | Dec-2014 | NO | Erosion of natural deposits; Leaching |
| Boron | N/A | N/A | 0.42 | mg/l | Dec-2014 | NO | Erosion of natural deposits; Leaching |
| Silica | N/A | N/A | 0.54 | mg/l | Dec-2014 | NO | Erosion of natural deposits; Leaching |
| Calcium | N/A | N/A | 2.0 | mg/l | Dec-2014 | NO | Erosion of natural deposits; Leaching |
| Magnesium | N/A | N/A | 0.77 | mg/l | Dec-2014 | NO | Erosion of natural deposits; Leaching |
| Sulfate | 250 | N/A | 22.0 | mg/l | Dec-2014 | NO | Runoff/leaching from natural deposits |
| Potassium | N/A | N/A | 1.2 | mg/l | Dec-2014 | NO | Erosion of natural deposits; Leaching |
| Nitrates | N/A | N/A | 1.4 | mg/l | Dec-2014 | NO | Stormwater runoff |
| Copper | N/A | 1.3 | 0.001 | mg/l | Dec-2014 | NO | Corrosion of plumbing systems; erosion of natural deposits |
| Iron | N/A | 0.3 | 0.02 | mg/l | Dec-2014 | NO | Erosion of natural deposits; Leaching |
| Zinc | N/A | 5 | 0.009 | mg/l | Dec-2014 | NO | Erosion of natural deposits; Leaching |
| Note: All other Inorganic Compounds, Organic Compounds, Pesticides, PCBs, Total Trihalomethanes and Radionuclides, Lead, and Total Coliforms were not detected. | | | | | | | |

| **Unit Descriptions** | |
|---|---|
| **Term** | **Definition** |
| 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 Drinking Water Definitions | |
|---|---|
| **Term** | **Definition** |
| N/A | Not Applicable |
| 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. |
| 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. |
| TT | Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water. |
| AL | Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements. |
| Variances and Exemptions | Variances and Exemptions: EPA permission not to meet an MCL or a treatment technique under certain conditions. |
| 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. |
| 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. |
| MNR | Monitored Not Regulated |
| MPL | State Assigned Maximum Permissible Level |

## Violation(s) or Exceedance(s)

During June 2014, Camp Lemonnier experienced a slight exceedance in drinking water lead concentrations (0.0025 mg/l). The maximum contaminant level, or MCL, for lead is 0.0015 mg/l. The exceedance occurred at a single location on Camp in Building 130. Subsequent drinking water sampling during 2014 did not result in any elevated lead concentrations in Building 130 or other locations throughout Camp Lemonnier.

The specific cause for the elevated lead concentrations is unknown, but it is likely the result of corrosion of plumbing materials and erosion of natural deposits. Lead leaches into water through corrosion, a dissolving or wearing away, of metal caused by a chemical reaction between water and plumbing. Lead can leach into water from pipes, solder, fixtures and faucets, and fittings. The amount of lead in 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.

Therefore, it is recommended to flush pipes before drinking, and only use cold water for consumption. Hot water is likely to contain higher levels of lead. The more time water has been sitting in pipes, the more lead it may contain. Anytime the water in a particular faucet has not been used for six hours or longer, "flush" cold-water pipes by running the water until it becomes as cold as it will get. This could take as little as five to thirty seconds if there has been recent heavy water use, such as showering or toilet flushing. Otherwise, it could take two minutes or longer. Additional information is available at www.epa.gov/safewater/lead.

## 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