



CONSUMER CONFIDENCE REPORT 2013

DRINKING WATER

NSA I BAHRAIN

NSA Bahrain is committed to providing its customers safe and reliable supply of drinking water.

EXECUTIVE SUMMARY

This Consumer Confidence Report (CCR) for 2013 confirms that water collected from NSA Bahrain during the year 2013 is safe for drinking and meet or exceed the requirements of the US Department of Defense Final Governing Standards (FGS). Tests conducted by an internationally accredited laboratory indicate that the water from NSA Bahrain is safe for drinking. This Consumer Confidence Report is prepared in accordance with the Bahrain Final Governing Standards, CNIC Instructions 5090.1 and 5090.3, and COMNAVREGEUR Instruction 11330.1

Annual Declaration of Potability

The Naval Support Activity (NSA I) Bahrain drinking water is declared Fit For Human Consumption. This declaration is based on the Drinking Water monitoring results conducted by the Naval Branch Health Clinic (NBHC) and the NSA Bahrain Environmental Department water analysis test results.

NSA I BAHRAIN

DRINKING WATER CONSUMER CONFIDENCE REPORT 2013



Background

Every calendar year Naval Support Activity (NSA) Bahrain issues CONSUMER CONFIDENCE REPORT (CCR) to its consumers detailing the quality of drinking water that it supplies. Currently NSA Bahrain has a treatment facility and the compliance of treated water produced at this facility is as below:

Location	Compliance status
NSA I	Fit for Human Consumption

Mandatory Information

- a) Applicable Water Quality Standards - Final Governing Standards (FGS);
- b) Water quality Table

NSA I drinking water is in compliance with the DOD's Environmental Final Governing Standards (FGS) for Bahrain. The FGS is a compendium of the stricter of the U.S. Environmental Protection Agency (EPA) and Kingdom of Bahrain. Waters from Aviation Unit (AV Unit) and BANZ are also tested regularly in accordance with the FGS guidelines and evaluated for "Fit for human Consumption" criteria. FGS prescribes regulations that limit the amount of certain contaminants in water provided by our water systems. Tests results of the drinking water samples show that chemical parameters analyzed are below the maximum allowed contaminant levels (MCLs). A detailed list of constituents found in our drinking water is included in this report, along with a comparison to the MCLs

1. GENERAL INFORMATION

a. Source of NSA water

NSA Bahrain purchases treated water from the City of Manama. This water comes from the ocean and is treated at the Al Hidd Water Plant, a multi-stage flash distillation plant. Distillation of ocean water for human consumption is a common practice worldwide.

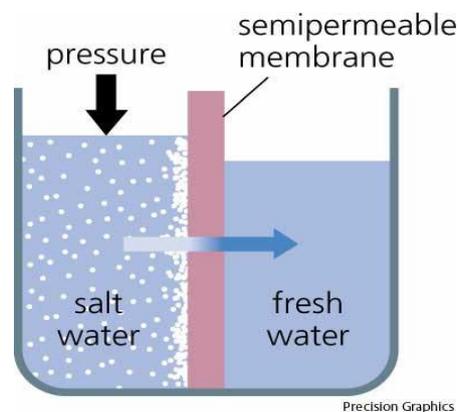
b. About Treatment Process

NSA operates Reverse Osmosis (RO) plants that supply clean and safe drinking water to the consumers at NSA I. The RO plant at NSA I is operated by Public Works Department (PWD) contractor G4S.

NSA I:

Water received from the City of Manama- HIDD plant is further treated at NSA I Bahrain facility using 3-stage Reverse Osmosis (RO) units, to render the water potable, and of high aesthetic quality using appropriate anti-scalant and sodium meta-bisulfite prior to purification. Disinfection of the water is achieved by chlorination. This potable water is stored in secured and controlled access tanks at each facility for direct distribution to various outlets throughout NSA's water distribution network.

The main treatment facility for NSA I Bahrain has a processing capacity of 288,000 gallons per day (gpd) .



A typical RO process

The Naval Facilities Engineering Command (NAVFAC) conducted a comprehensive sanitary survey of the NSA Bahrain drinking water system in September 2013. This survey, which will be updated in August 2016, provided an evaluation of the adequacy of the drinking water source, facilities, equipment, operation and maintenance for producing and distributing safe drinking water.

Nature of Pollutants and their possible sources

Drinking water should be adequately treated to remove harmful chemicals, heavy metals and pathogenic bacteria. These contaminants when present at or above acceptance levels may be harmful to humans. Additionally, drinking water may contain certain additives and essential mineral which are added during treatment to provide taste, growth and development of the human body

Bahrain's drinking water source is distilled; however, distillation is not 100% effective in removing all contaminants because:

- 1) Droplets of un-vaporized liquid can be carried with the steam prior to distillation, and
- 2) Some contaminants have boiling points similar to water and will be vaporized and condensed with the distilled water. Due to this, some substances may be present in source drinking water, such as:

Nature of contaminant	Sources
Microbial contaminants	Bacteria, viruses, parasite and other microorganisms are at times found in water causing illness These illnesses are caused by bacteria, viruses and protozoa that make their way into the water supply. However, even well operated water utilities cannot ensure drinking water is entirely free of microbial pathogens. Runoff, or water flowing over the land surface, may pick up these pollutants from wildlife and soils. This often occurs after flooding. Some of these organisms can cause a variety of illnesses. Symptoms include nausea and diarrhea. These can occur shortly after drinking contaminated water. The effects could be short term yet severe or might recur frequently or develop slowly over a long time
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;
Pesticides and Herbicides	Fertilizers and pesticides are regularly used to promote growth and reduce insect damage. The chemicals in these products may end up in ground water. Many fertilizers contain forms of nitrogen that can break down into harmful nitrates. Some underground agricultural drainage systems collect fertilizers and pesticides. This polluted water can pose problems to ground water and local streams and rivers. In addition, chemicals used to treat buildings and homes for termites or other pests may pose a threat
Organic chemical contaminants	Most of these contaminants are from industrial, chemical, petroleum and waste generating facilities. The chemicals compounds may be low boiling Organic chemical, high boiling point organic, cosmetic industry by -products
Radioactive contaminants	Certain radionuclide (example Barium and Strontium) are naturally occurring and form a part of the earth crust. Others radionuclide may be present as contaminants due to their use as tracers in the oil fields

Treated water supplied by city of Manama to NSA through their distribution network is treated, dosed with disinfectants and processed at NSA I Bahrain facility to eliminate harmful pollutants using Reverse Osmosis (RO) units, to render the water potable, and of aesthetic quality.

The presence of the above 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. You can learn more about contaminants and any potential health effects by visiting the EPA's Drinking Water Standards web site:

<http://permanent.access.gpo.gov/lps21800/www.epa.gov/safewater/standards.html> or by calling their Safe Drinking Water Hotline: 1-800-426-4791.

2. MANDATORY INFORMATION

a. Applicable Water Quality Standards.

Drinking water is deemed to be Fit for human consumption if the levels of pollutants are below the **Maximum Contaminant Levels (MCL)**. Drinking water systems distributed on the base must meet the requirement of the **Final Governing Standards (FGS)**. FGS documents are developed after a comprehensive review and comparison of U.S. EPA's Safe Drinking Water Act (SDWA) and Kingdom of Bahrain drinking water standards. When Bahraini and U.S. standards differ, the *most protective* requirement is adopted and incorporated into the FGS.

NSA Bahrain's drinking water is monitored regularly for various parameters by an independent laboratory to ensure consumer's health and safety. Regular sampling is conducted to detect:

- Bacteriological
- Inorganic and Organic Compounds
- Pesticides and PCBs
- Total Trihalomethanes (disinfection by-products)
- Radionuclide

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 Hotline: 800-426-4791.

This report is produced in accordance with the requirements of COMNAVREGEURINST 11330.1, Drinking Water Management, CNIC Instructions, OPNAV Instructions 5090.1D

b. Water Quality Data Table

The table below lists drinking water contaminants and relevant data collected during 2013 sampling (unless otherwise noted). The presence of contaminants in the water does not necessarily indicate that the water poses a health risk. All substances detected in NSA I Bahrain's drinking water are below the FGS allowable Maximum Contaminant Levels (MCL) and meet FGS requirements.

Water is produced at NSA I Bahrain after the RO process has been tested daily for pH, chlorine, conductivity and total dissolved solids (TDS). During the year 2013 samples of water were tested quarterly for physical,

inorganic and organic chemicals. Additionally, numerous samples were analyzed semi-annually for lead and copper. Water samples from taps collected at NSA I Bahrain were analyzed monthly for Coliform Bacteria.

NSA I Bahrain Water Treatment Facility							
Contaminant	Unit	MCL From FGS	Annual Average Results			Compliance to FGS	Possible Source
			2011	2012	2013		
Copper	mg/L	1.3	0.02	0.05	0.004	Yes	Corrosion or erosion of copper plumbing, faucets, taps and natural deposits

Contaminants and their Possible Sources

In the table below various contaminants and their possible sources are identified. These components are health hazards when they exceed certain levels.

Contaminant	Possible Sources	NSA I water
		Compliance
Inorganic contaminants	<p>Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder</p> <p>Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits</p> <p>Infiltration through soil, sediment and rock that form earth crust. Water travelling over the earth surface dissolves salts and minerals. Direct flow through improperly built wells that become conduits for contamination. Cross contamination below the ground surface from other aquifers through the casings of improperly built wells.</p>	YES
Organic contaminants	<p>Most of these contaminants are from industrial, chemical, petroleum and waste generating facilities. The chemicals compounds may be low boiling Organic chemical, high boiling point organic, cosmetic industry by-products</p>	YES
Pesticides and herbicides	<p>Pesticides are carried in rainwater runoff from farm fields, suburban lawns, or roadside embankments into the nearest creeks and streams. Occasionally they are even intentionally sprayed into waterways as part of a pest-control effort also enter environment as herbicides, insecticides, fungicides, rodenticides, and algicides.</p>	YES
Volatile organic compounds	<p>Enter environment when used to make plastics, dyes, rubbers, polishes, solvents, crude oil, insecticides, inks, varnishes, paints, disinfectants, gasoline products, pharmaceuticals, preservatives, spot removers, paint removers, degreasers, and many more.</p>	YES

Contaminant	Possible Sources	NSA I water
		Compliance
Microbial contaminants	Even though most viruses and bacteria are extremely sensitive to temperature and pressure, there are a few that are immune. Occur naturally in the environment from soils and plants and in the intestines of humans and other warm-blooded animals.	YES
Radionuclide	Certain radionuclide (example Barium and Strontium) are naturally occurring and form a part of the earth crust. Others radionuclide may be present as contaminants due to their use as tracers in the oil fields	YES

INFORMATION ON ADDITIONAL FACILITIES MANAGED BY NSA:

AV UNIT:

Background

Every calendar year Naval Support Activity (NSA) Bahrain issues CONSUMER CONFIDENCE REPORT (CCR) to its consumers detailing the quality of drinking water that it supplies. Currently NSA Bahrain **AV Unit** has no treatment facility and the compliance of water at this facility is listed below:

Location	Compliance status
AV UNIT	Unfit for Human Consumption for internal uses (drinking and oral hygiene), authorized as safe for external uses (Hand-washing and showering)

AV UNIT:

The Aviation Unit, also formally referred to as "Air Logistics Department," is located next to the Bahrain International Airport. The unit includes active duty military, reservists, DOD civilians, and local national civilians. The Aviation Unit is located adjacent to the Bahrain International Airport. The source water from the City water distribution system is stored at the site in secured above ground horizontal Steel storage tanks of around 150,000 gallon capacities. From these tanks the facilities receives the non-potable water via the onsite distribution system.



AV Unit water storage tanks

The Naval Facilities Engineering Command (NAVFAC) conducted a comprehensive sanitary survey of the NSA Bahrain drinking water system in September 2013. This survey, which will be updated in August 2016, provided an evaluation of the adequacy of the drinking water source, facilities, equipment, operation and maintenance for producing and distributing safe drinking water.

c. Water Quality Data Table

The table below lists drinking water contaminants and relevant data collected during 2013 sampling (unless otherwise noted). The presence of contaminants in the water does not necessarily indicate that the water poses a health risk. All substances detected in AV Unit NSA Bahrain water are below the FGS allowable Maximum Contaminant Levels (MCL).

NSA Bahrain AV Unit Water					
Contaminant	Unit	MCL From FGS	Annual Average Results (2013)	Compliance to FGS	Possible Source
Copper	mg/L	1.3	0.004	Yes	Corrosion or erosion of copper plumbing, faucets, taps and natural deposits

Contaminants and their Possible Sources

In the table below various contaminants and their possible sources are identified. These components are health hazards when they exceed certain levels.

Contaminant	Possible Sources	AV Unit water
		Compliance
Inorganic contaminants	<p>Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder</p> <p>Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits</p> <p>Infiltration through soil, sediment and rock that form earth crust. Water travelling over the earth surface dissolves salts and minerals. Direct flow through improperly built wells that become conduits for contamination. Cross contamination below the ground surface from other aquifers through the casings of improperly built wells.</p>	YES
Organic contaminants	<p>Most of these contaminants are from industrial, chemical, petroleum and waste generating facilities. The chemicals compounds may be low boiling Organic chemical, high boiling point organic, cosmetic industry by-products</p>	YES
Pesticides and herbicides	<p>Pesticides are carried in rainwater runoff from farm fields, suburban lawns, or roadside embankments into the nearest creeks and streams. Occasionally they are even intentionally sprayed into waterways as part of a pest-control effort also enter environment as herbicides, insecticides, fungicides, rodenticides, and algaecides.</p>	YES
Volatile organic compounds	<p>Enter environment when used to make plastics, dyes, rubbers, polishes, solvents, crude oil, insecticides, inks, varnishes, paints, disinfectants, gasoline products, pharmaceuticals, preservatives, spot removers, paint removers, degreasers, and many more.</p>	YES
Microbial contaminants	<p>Even though most viruses and bacteria are extremely sensitive to temperature and pressure, there are a few that are immune. Occur naturally in the environment from soils and plants and in the intestines of humans and other warm-blooded animals.</p>	YES
Radionuclide	<p>Certain radionuclide (example Barium and Strontium) are naturally occurring and form a part of the earth crust. Others radionuclide may be present as contaminants due to their use as tracers in the oil fields</p>	YES

Reason for Non Potability of AV Unit Water and Mitigation Measures:

Since the City source water is not further treated at the AV Unit, it is classified as not fit for human consumption for internal uses (drinking and oral hygiene). Since there have been no noted issues in monitored water quality as noted in the table above, the water is authorized as safe for external uses (hand-washing and showering).

The AV unit water system is owned by the facility lessor and is currently used for external uses only. The reasons for the system being not fully fit for Human Consumption as per Final Governing Standards (FGS), March 2012 guidelines can be outlined as:

1. The source of water at the AV Unit is the Host Nation municipal water system. Despite presumption that the water in the Host Nation system has been treated and is potable, the water in them is by military doctrine considered nonpotable until approved for use. The Host Nation water may be contaminated after it has been treated through broken water lines or cross-connections in the storage and distribution systems that are not readily visible.
2. The Raw water storage tanks in the AV unit do not have a Navy standard maintenance program. Lack of a cross connection and back flow prevention program for the distribution system.

As a risk mitigation measure, personnel at the AV unit are advised to drink bottled water from local water bottling companies that have been certified by the US Army Veterinarian to meet US guidelines.

BANZ AREA (BAHRAIN AND NEW ZEALAND GOVERNMENTS' WAREHOUSE)

Background

Naval Support Activity (NSA) Bahrain issues CONSUMER CONFIDENCE REPORT (CCR) to its consumers detailing the quality of drinking water that it supplies. Currently NSA Bahrain BANZ Area has no treatment facility and the compliance of water at this facility is listed below:

Location	Compliance status
BANZ Area	Unfit for Human Consumption for internal uses (drinking and oral hygiene), authorized as safe for external uses (Hand-washing and showering)

BANZ AREA:

The BANZ warehouse is the Navy leased facility owned and operated by BANZ Group B.S.C. It is located next to the NSA I facility in southwest direction. The BANZ warehouse facility receives water from the City directly supplied through two connections. There is no water treatment at the BANZ area. The water system consists of separate domestic, fire, and irrigation water distribution systems. NSA Bahrain PWD maintains the fire systems. The source water is pumped from the City water distribution system to the above ground storage tanks of around 139,000 gallons capacities located near warehouses # 8 and 12.

Sampling of BANZ Area Water samples started in February 2014 and so far the analysis results have no maximum contaminant level (MCL) exceedances or violations for any of the tests parameters specified in the Bahrain Final Governing Standards (FGS). The source of water at the BANZ Area is the Host Nation municipal water system. Despite presumption that the water in the Host Nation system has been treated and is potable, the water in them is by military doctrine considered nonpotable until approved for use. The Host Nation water may be contaminated after it has been treated through broken water lines or cross-connections in the storage and distribution systems that are not readily visible. Since the City source water is not further treated at the BANZ Area, it is classified as not fit for human consumption for internal uses (drinking and oral hygiene). Since there have been no noted issues in monitored water quality, the water is authorized as safe for external uses (hand-washing and showering).

As a risk mitigation measure, personnel at the BANZ area are advised to drink bottled water from local water bottling companies that have been certified by the US Army Veterinarian to meet US guidelines.



BANZ Area Storage tanks near warehouse # 8

Additional information:

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. We provide 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 thirty seconds to two minutes before using water for drinking or cooking.

Nitrite:

Infants below six months who drink water containing nitrite in excess of the maximum contaminant level (MCL) could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome. The major sources of nitrite in drinking water are runoff from fertilizer use; leaching from septic tanks, sewage; and erosion of natural deposits.

Arsenic:

Some people who drink water containing arsenic well in excess of the MCL for many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer. Arsenic enters drinking water supplies from natural deposits in the earth or from agricultural and industrial practices.

If you are concerned about lead in your water, please contact Environmental Office at 973-1785-4603 / DSN:318-439-4603. Information on lead, Nitrite and Arsenic in drinking water and the steps you can take to minimize exposure is available from the USEPA Safe Drinking Water website:

www.epa.gov/safewater/lead

<http://water.epa.gov/drink/contaminants/basicinformation/nitrite.cfm>

<http://water.epa.gov/drink/contaminants/basicinformation/arsenic.cfm>

Unit Descriptions	
Term	Definition
Ppm or mg /L	Parts Per Million, or milligrams per liter (mg/L)
ppb	Parts Per Billion, or micrograms per liter (µg/L)
ND	Not Detected

Important Drinking Water Definitions	
Term	Definition
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.
Term	Definition
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. which a water system must follow.

What Commands and Departments are involved in the Installation Water Quality Board to provide safe drinking water? What are their responsibilities?	
NAVFAC Bahrain Public Works Department (PWD) – Utilities	<ul style="list-style-type: none"> • Operation and maintenance of drinking water treatment and distribution systems including cleaning of tanks, system disinfection, flushing, and backflow prevention. Note: PWD contracts with G4S to operate and maintain the reverse osmosis treatment system. • Coordinate with Environmental Division to update the master plans.
NAVFAC SWA Environmental Program	<ul style="list-style-type: none"> • Overall compliance with FGS (includes EPA and Bahraini Drinking Water Standards). • Coordination of drinking water sampling and laboratory analysis. • Recordkeeping. • Source water surveys, master plans, sanitary surveys, and laboratory contract services
US Naval Branch Health Clinic Bahrain (Cognizant Medical Authority)	<ul style="list-style-type: none"> • Certification of base drinking water systems as potable. • Bacteriological monitoring. • Health effects advice and implementation of protective measures associated with any instances of non-compliance.
Naval Facilities Engineering Command	<ul style="list-style-type: none"> • Treatment plant construction/upgrades
NSA Bahrain Public Affairs Office	<ul style="list-style-type: none"> • Public notification of any non-compliance issues associated with on-base drinking water systems. Public notification covers potential adverse health effects/risks, corrective actions, alternative water supplies and protective measures. • Public notification of any non-compliance issues associated with off-base systems in the surrounding community which may affect station personnel. • Issuance of CCR's. • Community Outreach.
NSA Bahrain Housing Office	<ul style="list-style-type: none"> • Coordination of drinking water issues relating to base housing

These Commands comprise the Installation water Quality Board (IWQB) at NSA Bahrain. NSA Bahrain IWQB covers NSA I, DoDDS, NSAI, AV Unit and BANZ Area.

If you have any questions regarding this report or about the drinking water processes, please contact Awni M. Almasri Regional Environmental Director/IWQB Coordinator, Commercial Phone +973-1785-4603, DSN:439-4603.

Awni M. Almasri

**Regional Environmental Coordinator
Coordinator, Installation Water Quality
Board**

Phone: +973-17-85-4603

Email: awni.almasri@me.navy.mil

REFERENCE DOCUMENTS:

- Final Governing Standards (FGS), March 2012
- COMNAVREGEUR Instruction 11330.1
- CNIC Instructions, February 2013
- OPNAV Instructions 5090.1D