Drinking Water Quality Annual Report

Kunsan AB, 2016

This annual report summarizes the quality of water delivered by Kunsan AB. Under the "Consumer Confidence Reporting Rule" of the federal Safe Drinking Water Act (SDWA), community water systems are required to report this water quality information to the consuming public. Of the sampling conducted in 2016 we are proud that 80+ different substances were below the Maximum Contaminant Level (MCL). Presented in this report is information on the source of our water, its constituents and the health risks associated with any contaminants. Our goal is to provide you with a safe and dependable supply of drinking water.

"A copy of this Water Quality Report in Korean can be obtained by contacting the Kunsan Bioenvironmental Engineering office at 782-6541 or 011-82-63-470-6541. This report is designed to further public understanding about public water systems and potential hazards"

"이 보고서에는 귀하의 식수에 대한 중요한 내용이 실려있습니다. 그러므로 이 보고서를 이해할 수 있는 사람한테 번역해 달라고 부탁하시기 바랍니다. 보고서에 대한 질문은 생물환경공학과 782-6541 로 문의 하시기 바랍니다."

Where does our water come from?

All potable water supplied to the Kunsan WTP is sourced from the Okku Reservoir. This reservoir is located approximately 2.5 km north-east of Kunsan AB and is primarily an agricultural use reservoir. Secondary water sources for Kunsan AB include a direct connection with the regional water purveyor, K-Water which provides water from the Yongdam Reservoir. Kunsan AB used its secondary source (K-Water) intermittently during the monitoring period. A copy of the Kunsan AB's most recent sanitary survey containing information on the source in which we receive our water can be obtained from Bioenvironmental Engineering. For a copy please contact them at 782-4670.

How pure is our water?

The sources of drinking water (both tap 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 human activity. Contaminants that may be present in source or untreated water include:

- ***Microbial contaminants***, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- ***Inorganic contaminants***, 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***, which may come from agriculture, urban storm water runoff, and residential uses.
- ***Organic chemical contaminants***, including synthetic and volatile organics, which are by-products of industrial processes and petroleum production, and can come from gas stations, urban storm water runoff, and septic systems.
- ***Radioactive Contaminants***, which can be naturally-occurring or the result of oil/gas production and mining activities.
- In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. FDA regulations establish limits for contaminants in bottled water which must provide the same protection for public health.
- 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 water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline (800-426-4791).
- The 8 CES/CEOIU manages the maintenance and operation of the drinking water supply and distribution system. CES Utility personnel operate on 24 hour work shifts to ensure the system is pressurized and maintains sufficient chlorine residual.
- The 8 MDOS Bioenvironmental Engineering (BE) Flight monitors the quality of the drinking water provided to consumers and addresses any health related concerns. Analysis is conducted by certified laboratories.

How our water is monitored?

Kunsan AB BE routinely monitors for over 80 contaminants using certified laboratories and approved methods in accordance with Korean Environmental Governing Standards (KEGS).

- ***Microbial contaminants*** sampling is conducted every other week at distribution points (such as the clinic, dining facility, BX and various other administrative and industrial work centers on base), to include analysis for the levels of chlorine in the water. A total of 104 microbiological samples were taken and no samples were positive for microbial contaminants.
- ***Other contaminants*** (*inorganic, pesticides & herbicides, organic chemical and radioactive contaminants*) are monitored on different frequencies respectively. Some contaminants are only monitored every 4 years and for those, the last sampling results are listed on Table 1. The contaminants listed in the table were the only primary contaminants detected in our drinking water.

Potential Health Effects & Risk

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. EPA/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 (800-426-4791).

About Lead in Drinking Water: 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. 8 CES/CEOIU is 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. [BE monitors lead and copper in housing semi-annually. **All test results for lead have met KEGS drinking water requirements.**] 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 (1-800-426-4791) or at http://www.epa.gov/safewater/lead.

Of the sampling conducted in 2016 we are proud that 80+ different substances were below the Maximum Contaminant Level (MCL).

Table 1: 2016, Kunsan AB Water Monitoring Data for the period of January 1 to December 31, 2016

Substances	Violation? Yes / No	Units	Detected Level	MCLG	MCL (KEGS)	Likely Source of Contamination
			Annual Average			
Inorganic Chemicals						
Antimony	No	PPB	0.125	6	6	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Arsenic	No	PPB	0.85	10	50	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Barium	No	PPB	0.0175	2	4	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Beryllium	No	PPB	0.0125	4	5	Discharge from metal refineries and coal-burning factories; Discharge from electrical, aerospace, and defense industries
Cadmium	No	PPB	0.125	5	100	Corrosion of galvanized pipes; Erosion of natural deposits; Discharge from metal refineries; Runoff from waste batteries and
Chromium (total)	No	PPB	2.5	100	200	Discharge from steel and pulp mills; Erosion of natural deposits
Cyanide (free)	No	PPB	0.025	2	2	Discharge from steel/metal factories; Discharge from plastic and fertilizer factories
Flouride	No	PPB	0.155	4	100	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Mercury (total)	No	PPB	0.125	2	50	Erosion of natural deposits; Dis charge from refineries and factories; Runoff from landfills; Runoff from cropland
Nickel	No	PPB	0.125	2	2	Leaching from metals, such as pipes and fittings or dissolution from nickel ore-bearing rocks
Selenium	No	PPB	0.125	50	50	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines
Sodium	No	PPB	0.85	N/A	N/A	Erosion of natural deposits
Thallium	No	PPB	0.0175	0.5	2	Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories
Synthetic Organic Compounds including: Volatile Organic Chemicals, Pesticides, and PBCs						

Benzene	No	PPB	0.0625	0	5	Discharge from factories; Leaching from gas storage tanks and landfills
Carbon tetrachloride	No	PPB	0.0625	0	5	Discharge from chemical plants and other industrial activities
o-Dichlorobenzene	No	PPB	0.0625	600	600	Discharge from industrial chemical factories
cis-1,2-Dichloroethylene	No	PPB	0.0625	70	70	Discharge from industrial chemical factories
trans-1,2-Dichloroethylene	No	PPB	6.5625	100	100	Discharge from industrial chemical factories
1,1-Dichloroethylene	No	PPB	0.0625	7	7	Discharge from industrial chemical factories
1,1,1-Trichloroethane	No	PPB	0.0625	200	200	Discharge from industrial chemical factories
1,2-Dichloroethylene	No	PPB	0.0625	5	5	Leached through subsurface soils to groundwater
Dichloromethane	No	PPB	0.11	0	5	Discharge from pharmaceutical and chemical factories
1,1,2-Trichloroethane	No	PPB	0.0625	3	5	Discharge from industrial chemical factories
1,2,4-Trichlorobenzene	No	PPB	0.1025	70	70	Discharge from textile-finishing factories
1,2-Dichloropropane	No	PPB	0.0625	0	5	Discharge from industrial chemical factories
Ethylbenzene	No	PPB	0.0625	700	700	Discharge from petroleum refineries
Chlorobenzene	No	PPB	0.0625	100	100	Discharge from chemical and agricultural chemical factories
p-Dichlorobenzene	No	PPB	0.0625	75	75	Discharge from industrial chemical factories
Styrene	No	PPB	0.0625	100	100	Discharge from rubber and plastic factories; Leaching from landfills
Tetrachloroethylene	No	PPB	0.0625	0	5	Discharge from factories and dry cleaners
Trichloroethylene	No	PPB	0.0625	0	5	Discharge from metal degreasing sites and other factories
Toluene	No	PPB	0.0000625	1	n/a	Discharge from petroleum factories
Vinyl Chloride	No	PPB	0.0975	0	2	Leaching from PVC piping; Discharge from plastics factories
Xylene (Total)	No	PPB	0.0002025	10	n/a	Discharge from petroleum factories; Discharge from chemical factories
Alachlor	No	PPB	0.00775	0	2	Runoff from herbicide used on row
Aldicarb	No	PPB	0.1325	3	3	Runoff from herbicide used on row crops
Aldicarb Sulfone	No	PPB	0.055	4	4	Runoff from herbicide used on row crops
Aldicarb Sulfoxide	No	PPB	0.055	3	3	Runoff from herbicide used on row crops
Atrazine	No	PPB	0.00475	3	3	Runoff from herbicide used on row crops
Benzo [a} pyrene	No	PPT	5	0	200	Leaching from linings of water storage tanks and distribution lines

Carbofuran	No	PPB	0.0875	0	40	Leaching of soil fumigant used on rice and alfalfa
Chlordane	No	PPB	0.0105	0	2	Residue of banned termiticide
Dalapon	No	PPB	0.2225	200	200	Runoff from herbicide used on rights of way
2,4-D	No	PPB	0.02025	70	70	Runoff from herbicide used on row crops
1,2-Dibromo-chloropropane	No	PPT	1.225	200	200	Possible migration from soil when used as nematocidal fumigant.
Di (2-ethylhexyl) adipate	No	PPB	0.1	400	400	Discharge from chemical factories
Di (2-ethylhexyl) phthalate	Yes	PPB	6	0	6	Discharge from rubber and chemical factories
Dinoseb	No	PPB	0.04	7	7	Runoff from herbicide used on soybeans and vegetables
Endrin	No	PPB	0.00045	2	2	Residue of banned insecticide
Endothall	No	PPB	1.075	100	100	Runoff from herbicide use
Ethylene Dibromide (EDB)	No	PPT	1.875	0	50	Dischargefrom petroleum refineries
Glyphosate	No	PPB	0.7	700	700	Runoff from herbicide use
Hepachlor	No	PPT	1.35	0	400	Residue of banned pesticide
Heptachlorepoxide	No	PPT	0.675	0	200	Breakdown of heptachlor
Hexachlorobenzene	No	PPB	0.002475	0	1	Discharge from metal refineries and agricultural chemical factories
Hexachlorocyclopentadiene	No	PPB	0.00725	50	50	Discharge from chemical factories
Lindane	No	PPT	0.675	200	200	Runoff/leaching from insecticide used on cattle, lumber, gardens
Methoxychlor	No	PPB	0.00325	40	40	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock
Oxamyl (Vydate)	No	PPB	0.1075	200	200	Runoff/leaching from insecticide used on apples, potatoes and tomatoes
PCBs (as decachlorobiphenyls)	No	PPT	18	0	500	Runoff from landfills; Discharge of waste chemicals
Pentachlorophenol	No	PPB	0.0075	0	1	Discharge from wood preserving factories
Picloram	No	PPB	0.0235	500	500	Herbicide runoff
Simazine	No	PPB	0.01	4	4	Herbicide runoff
Toxaphene	No	PPB	1.9125	0	3	Runoff/leaching from insecticide used on cotton and cattle
2,4,5-TP (Silvex)	No	PPB	0.04	50	50	Residue of banned herbicide
Disinfectant/Disinfection By-Product						
TTHM	No	PPB	52.7		80	By-product of drinking water disinfection
HAA5	No	PPB	7.45		60	By-product of drinking water disinfection
Lead and Copper						

Substance	Violation	Units	90th Percentile	Sites Exceeding AL/No. of Sites	Goal	AL[1]	Likely Source of Contamination
Lead	No	mg/L	0.004	0/37	0.00	0.015	Leeching from pipes into water
Copper	No	mg/L	0.238	1/37	1.3	1.3	Leeching from pipes into water

Perfluorooctane Sulfonate and Perfluorooctanoic Acid (PFOS/PFOA)								
Substance	Violation	Units	Detected Level		EPA Health Advisory	MCL	Last Sampled	Likely Source of Contamination
			Highest	Lowest		KEGS		
PFOS	No	ppt	ND	ND	70	Unregulated N/A	Nov 2016	Synthetic fluorinated organic compounds used in many industrial and consumer products such as nonstick cookware, stain-resistant fabric and carpet, some food packaging and specialized foam like the firefighting agent Aqueous Film Forming Foam, or AFFF.
PFOA	No		12	ND	70			

Radioactive Particles							
Substance	Violation	Units	Highest	Lowest	Goal	AL	Likely Source of Contamination
Gross Alpha	**No**	pCi/L	2.82 ± 0.917	1.93U ± 1.10	0.00	15	Erosion of natural deposits
Radium 226	**No**	pCi/L	0.255 ± 0.261	0	0.00	5	Erosion of natural deposits
Radium 228	**No**	pCi/L	0.755 ± 0.332	0	0.00	5	Erosion of natural deposits
Uranium	**No**	ug/L	0.197± 0.102	0.193± 0.003	0.00	30	Erosion of natural deposits
Gross Beta	**No**	ug/L	2.16± 1.61	4.63	0.00	50	Erosion of natural deposits

Notes:
1. The AL for Lead and Copper is based on a 90th percentile value – i.e., no more than 10% of all sampled taps.
The contaminants listed in the table were the only primary contaminants detected in our drinking water.

Terms Defined

Action Level (AL) - Indicates the level of a harmful or toxic substance/activity which requires medical surveillance, increased industrial hygiene

monitoring, or biological monitoring.
Maximum Contaminant Level (MCL) - 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.
Maximum Contaminant Level Goal (MCLG) - The level of a contaminant in drinking water below which there is no expected health risk. MCLGs allow for a margin of safety.
Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.
Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
Maximum residual disinfectant level goal or MRDLG: 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.
Maximum residual disinfectant level or MRDL: 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.
Microgram per liter (ug/L) - 1/1,000,000th of a gram corresponds to 1 minute in 2 years, or a single penny in $10,000.
Minimum Reporting Limit (MRL)
N/A - Not applicable, No MCL established
ND - Means not detected and indicates that the substance was not found by laboratory analysis.
Nanogram Per Liter (ng/L) – 1/1,000,000,000th of a gram corresponds to 1 minute in 2,000 years, or a single penny in $10,000,000.
NR – Means not required.
Parts per million (ppm) - One ppm corresponds to 1 minute in 2 years, or a single penny in $10,000.
Parts per billion (ppb) - One ppb corresponds to 1 minute in 2,000 years, or a single penny in $10,000,000.
Picocuries per liter (pCi/L) - Picocuries per liter is a measure of radioactivity in water.
Reference Concentration- The reference concentrations are based on publically-available health information found in the following EPA resources: 2012 Drinking Water Standards and Health Advisories (HAs), the CCL 4 Contaminant Information Sheets (i.e., HRLs), the Human Health Benchmark for Pesticides (HHBPs), or the 2014 Preliminary Regulatory Determinations for Contaminants on CCL 3 (i.e., HRLs). The primary/secondary sources of health information vary with respect to scientific rigor from health assessment to single studies. Many of the contaminants are currently under regulatory review or development and are subject to change as new health assessments are completed."

Customer Views Welcome!!

If you have any specific issues or concerns that you would like to address, you may present them to the Occupational and Environmental Health Working Group or Drinking Water Working Group. To schedule an appointment at this working group, please contact Bioenvironmental at 782-4670 or 8 CES/CEOIU (Water Fuels) at 782-5519.

For more information on this report or base drinking water quality, please contact Bioenvironmental Engineering at 782-4670.

This CCR was prepared by Kunsan AB Bioenvironmental Engineering (8 MDOS/SGOJ) and will be posted on the Kunsan AB homepage http://www.kunsan.af.mil/

Information about EPA water regulations can be found at: http://www.epa.gov.