



ANNUAL DRINKING WATER QUALITY REPORT FOR 2010

Our Goal

"...the quality of water produced and distributed shall meet or exceed all State and Federal standards governing such distribution."

--excerpt, Statement of Purpose, Lincoln Water System



CITY OF LINCOLN
NEBRASKA
MAYOR CHRIS BEUTLER

Lincoln Water System

2021 N. 27th
Lincoln, NE

Chris Beutler
Mayor

Greg MacLean
Director
Public Works
and Utilities

WHY THIS REPORT?

The Safe Drinking Water Act requires the Lincoln Water System to annually issue a report describing the quality of your drinking water. The purpose of this report is to raise your understanding of drinking water and awareness of the need to protect our drinking water sources. This report provides an overview of last year's water quality data collected from January 1 through December 31, 2010, including details about your sources of water, what it contains and how it compares to State and Federal standards.



Este formulario tiene información muy importante acerca del agua que usted bebe. Consiga que alguien se lo lea en español.

Đây là một tài liệu rất quan trọng về nước uống của chúng ta tại Lincoln, xin quý bạn dành thì giờ để tìm hiểu. Tài liệu bằng tiếng Việt nam sẽ được in một ngày rất gần.

WHERE DOES OUR WATER COME FROM?

The sources of drinking water (both tap and bottled) include rivers, lakes, streams, ponds, reservoirs, springs and wells. Fortunately, our community receives its water from a self-replenishing source naturally high in quality. Lincoln's water comes from wells where the ground water is under the direct influence of surface water. In 2010, more than 11.3 billion gallons of water were pumped from these wells to serve the 258,000 people who use an average of about 31 million gallons of water each day.

A source water assessment of our water supply has been completed by the Nebraska Department of Environmental Quality (NDEQ). The assessment includes maps, an inventory of potential contaminant sources and a determination of the vulnerability of the system to contamination. If you have any questions or would like to view the source water assessment, please call Jerry Obrist, 402-441-7571, to schedule an appointment.

Home Treatment Systems

Since all water supplied by the Lincoln Water System meets or exceeds every State and Federal safe drinking water standard, use of home water treatment devices to further improve quality is an individual option.

If you consider purchasing a home water treatment system, determine what the device will remove and the total cost of maintenance.



This report and other information about water are available on the City's Web site at:

lincoln.ne.gov

PURIFYING OUR WATER

Thanks to the natural filtration of the aquifer, nature has already done much of the work in enhancing the quality of Lincoln's water. Our water still contains iron and manganese, which pose no health concern but can stain clothing and plumbing fixtures. To remove these unwanted elements, water is pumped to the water treatment plants. The water flows through one of two processes before it is sent to your home or business.

1. The oldest process, highly effective since the 1930s, uses aeration, chlorination, detention and filtration. An exact amount of chlorine is added to the water in a large underground reservoir. The water is held in the reservoir for up to two hours. The iron and manganese form particles which are then trapped in the sand and gravel filters. The filters are cleaned every 120 hours using a process called backwashing.

2. The second process uses ozone technology. Ozone, an extremely strong oxidizer and disinfectant, reacts quickly with iron and manganese to form particles which are then removed in the filtration process.

The next step is vital to protecting the health of our community. Once the water passes through the filters, small but exact amounts of chlorine and ammonia are added. These chemicals combine to form a disinfectant called "chloramine," which prevents the growth of bacteria in the City's water pipes. Finally, fluoride is added to help prevent tooth decay.

KEY TO TEST RESULTS

MCL - Maximum Contaminant Level: The highest level of a contaminant 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.

ppm - milligrams per liter or parts per million - or one in 7,350 gallons of water.

ppb - micrograms per liter or parts per billion - or one in 7,350,000 gallons of water.

N/A - Not applicable; **ND** - Not detected; **pCi/L** - pico Curies per liter (measure of radioactivity)

NTU - Nephelometric Turbidity Unit: A measure of the cloudiness of the water.

(a) No water was pumped from Lincoln peaking wells in 2010.

(b) Samples collected from homes and businesses in the distribution system.

(c) Water from the treatment plant does not contain lead or copper. Tests for lead and copper are collected from the customer's tap to ensure the substances have not been dissolved from the customer's service or interior piping system.

(d) Fluoride is added in treatment to bring the natural level of about 0.4 ppm to the optimum of 1.0 ppm.

(e) TT - Treatment Technique

* Action Level is the concentration of a contaminant which triggers treatment or another requirement which a water system must follow.

(f) Samples collected quarterly in 2010.

Water Quality Parameters (12/10/10)

pH (in pH units)	7.56	
Total Alkalinity (CaCO ₃)	186	ppm
Total Hardness (CaCO ₃)	226	ppm
<i>(12 grains per gallon)</i>		
Total Dissolved Solids	366	ppm
Calcium	61.7	ppm
Chloride	21.0	ppm
Iron	<0.05	ppm
Manganese	1.96	ppb
Sodium	31.5	ppm
Sulfate	88	ppm

Lincoln's water is moderately hard. Alkalinity, pH and hardness are important if considering a water softener.

TEST RESULTS (2010 data unless otherwise noted)

Regulated Contaminants

Tested and Detected	Units	Regulatory Limit (MCL)	Goal (MCLG)	Ashland Plants	Lincoln (a)	Violation Yes/No	Likely Source(s)
Inorganic Contaminants							
Arsenic - Ashland (5/06) - Lincoln	ppb	10	N/A	7.1-8.9	2.99	No	Erosion of natural deposits; runoff from orchards; runoff from glass and electronic production.
Barium - (6/08) Lincoln	ppb	2000	2000	127	105	No	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits.
Chromium - (6/08) Lincoln	ppb	100	100	6.24-6.5	3.87	No	Discharge from steel and pulp mills; erosion of natural deposits.
Copper (c) - Lincoln	ppm	1.3*	1.3	N/A	0.66 (b)	No	Corrosion of household plumbing; erosion of natural deposits; leaching from wood preservatives.
Fluoride (d) (monthly) - Lincoln Ashland	ppm	4	4	0.797-0.86	0.84 -0.96 (b)	No	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories.
Lead (c) (7/07) - Lincoln	ppb	15*	0	N/A	4.35 (b)	No	Corrosion of household plumbing; erosion of natural deposits.
Nickel - Ashland (5/06) - Lincoln	ppb	100	N/A	2.09-2.51	8.55	No	Erosion of natural deposits; leaching
Nitrate+Nitrite - Ashland (6/09) - Lincoln	ppm	10	10	0.592-0.808	3.1	No	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits.
Selenium - Ashland	ppb	50	50	5.27	<5	No	Discharge from petroleum and metal refineries; erosion of natural deposits.

Synthetic Organic Contaminants (Pesticides and Herbicides)

Atrazine - Ashland (6/09) - Lincoln	ppb	3	3	0.17-0.272	0.2	No	Runoff from herbicide used on row crops.
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Volatile Organic Contaminants

Tetrachloroethylene (6/09) - Lincoln	ppb	5	0	-	0.68	No	Discharge from factories and dry cleaners.
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Radioactive Contaminants

Gross Alpha (4/07) - Ashland	pCi/L	15	0	3.2-10.2 (f)	-	No	Erosion of natural deposits.
Radium 226 & 228 combined (09) Ashland	pCi/L	5	0	1.5	-	No	Erosion of natural deposits.
Uranium combined (1/06) - Ashland	ug/L	30	0	5.6-8	-	No	Erosion of natural deposits.

Disinfection - By - Products

Trihalomethanes - Ashland Lincoln	ppb	80	N/A	17.3-39	21.2-40.7 (b)(f)	No	By-product of drinking water chlorination.
Total Haloacetic Acid (HAA5) - Lincoln	ppb	60	N/A	N/A	3.9-22.9 (f)	No	By-product of drinking water chlorination.
Bromate	ppb	10	0	4.5	N/A	No	By-product of drinking water chlorination.

Clarity

Turbidity (e)	NTU	0.3	N/A	0.05-0.30	N/A	No	Soil runoff.
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Microbiological	Total Coliform Maximum Contaminant Level	Goal (MCLG)	Highest Monthly Positive Coliform Samples	Total Positive E. Coli or Fecal Coliform Samples in 2007	Violation	Fecal Coliform or E. Coli Maximum Contaminant Level	Likely Source of Contamination
Coliform Bacteria	5% of monthly samples are positive	0	1 of 157 (0.6%)	0	No	Fecal Coliform or E. Coli MCL; A routine sample and a repeat sample are total coliform positive, and one is also fecal coliform or E. Coli positive.	Total Coliform Bacteria are naturally present in the environment. Fecal coliform and E. Coli are present in human and animal fecal waste.

Unregulated Contaminant (UCMR2) Monitoring Range Average

N-Nitrosodimethylamine (NDMA)	ppb	0.0022-0.0028	0.0026 (Lincoln)	By product of drinking water treatment.
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Repeated Testing

Unregulated Contaminants Tested

Although unregulated, Lincoln Water System monitors the following contaminants:

Tested and Detected	Units	Ashland	Lincoln
Sulfate (8/07)	ppm	83.7-97.6	69
Total Organic Carbon	ppm	2.40-3.80	- quarterly in 2010
Radon (1/06)	pCi/L	218-261	-
Metolachlor	ppb	0.10	-

Tested and Not Detected:

1,1,1,2-Tetrachloroethane, 1,1,2,2-Tetrachloroethane, 1,1-Dichloroethane, 1,1-Dichloropropene, 1,2,3-Trichloropropane, 1,3-Dichloropropane, cis-1,3-Dichloropropene, 2,2-Dichloropropane, Bromobenzene, Bromomethane, Chlorobenzene, Chloroethane, Chloromethane, Dicamba, Dibromomethane, m-Dichlorobenzene, m-Xylene, o-Chlorotoluene, o-Xylene, p-Chlorotoluene, p-Xylene, Aldrin, Butachlor, Dieldrin, Metribuzin, Propachlor, Paraquat, Methyl-T-Butyl-Ether (MTBE), 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, 1,2-Dibromoethane, 2-Chlorotoluene, n-butylbenzene, sec-Butylbenzene, tert-Butylbenzene, n-Propylbenzene, p-Isopropyltoluene, trans-1,3-Dichloropropene, Bromochloromethane, Chloropyrifos, Dichlorodifluoromethane, Hexachlorobutadiene, Naphthalene, Trichlorofluoromethane, Butylate, Cyanazine, 1,2-Dibromoethane, Fonofos, Isopropylbenzene, 1,2,3-Trichlorobenzene, Trifuralin, aldicarb, aldicarb sulfone, aldicarb sulfoxide, carbaryl, methomyl, 3-hydroxycarbofuran, Dimethoate, 2,2',4,4',5,5'-Hexabromodiphenyl (HBB), 2,2',4,4',5,5'-Hexabromodiphenyl ether (BDE-153), 2,2',4,4',5-Pentabromodiphenyl ether (BDE-99), 2,2',4,4',6-Pentabromodiphenyl ether (BDE-100), Terbufos-sulfone, 2,2',4,4'-Tetrabromodiphenyl ether (BDE-47), 1,3-Dinitrobenzene, RDX (Hexahydro-1,3,5-trinitro-1,3,5-Triazine), TNT (2,4,6-Trinitrotoluene), N-Nitrosodiethylamine (NDEA), N-Nitrosodi-N-butylamine (NDBA), N-Nitrosodi-N-propylamine (NDPA), N-Nitrosomethylethylamine (NMEA), N-Nitrosopyrrolidine (NPYR), Acetochlor, Acetochlor ESA, Acetochlor OA, Alachlor ESA, Alachlor OA, Metolachlor ESA, Metolachlor OA

Regulated Contaminants Tested and Not Detected:

Inorganic Chemicals: Antimony, Asbestos, Beryllium, Cadmium, Cyanide, Mercury, Thallium. *Volatile Organic Chemicals (VOC's):* Benzene, Carbon Tetrachloride, o-Dichlorobenzene, p-Dichlorobenzene, 1,2-Dibromo-3-chloropropane, 1,2-Dichloroethane, 1,1-Dichloroethylene, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, Dichloromethane, 1,2-Dichloropropane, Ethylbenzene, Chlorobenzene, 1,2,4-Trichlorobenzene, 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, Trichloroethylene, Vinyl Chloride, Styrene, Toluene, Xylenes (total). *Non-Volatile Synthetic Organic Chemicals including herbicides and pesticides:* Alachlor, Benzo(a)pyrene, Chlordane, Dalapon, Di(2-ethylhexyl)adipate, Dinoseb, Di(2-ethylhexyl)phthalate, Diquat, 2,4-D, Endothall, Endrin, Ethylene Dibromide, Heptachlor, Heptachlor Epoxide, Hexachlorobenzene, Hexachlorocyclopentadiene, Lindane, Methoxychlor, Pentachlorophenol, Polychlorinated Biphenyls, Simazine, Picloram, Toxaphene, 2,4,5-TP (Silvex), Carbofuran, Oxamyl.

Lincoln Water System Facts:

- LWS spends \$1.225 million for electricity and diesel fuel to pump water to Lincoln and another \$1.80 million for electricity to move water to all parts of the City.
- Every person in Lincoln used an average of 120 gallons of water every day in 2010 compared to 128 gallons per day in 2009.
- The City of Lincoln covers an area of more than 90 square miles.
- Lincoln Water System maintains 1,243 miles of water mains, 10,685 fire hydrants and 24,947 valves.
- 139 broken mains were repaired in 2010.
- Water services are owned and maintained by the property owner.
- Water delivered to your home or business can vary in temperature from 41°F to 77°F.

WHAT ELSE IS DONE TO PROTECT MY WATER?

The residential customer, the business customer and the commercial/industrial customer all share equally in protecting Lincoln's water. One way to do this is through a "cross connection control program." A cross connection is any physical or potential connection between the drinking water supply and a source of possible contamination or pollution. The purpose of the program is to protect the drinking water supply system by either eliminating cross connections or installing approved backflow prevention devices to prevent the contamination from entering the drinking water supply.

Contaminants and pollutants can enter the drinking water supply when there is a sudden loss of pressure from heavy usage or a fire in the area of a broken water main. When that happens, contaminated water could be siphoned through the plumbing system into the public water mains. These pressure drops occur somewhere in the City almost every day. Backflow prevention devices are invaluable in preventing contaminants from entering the water supply in these situations.

Every five (5) years property owners and tenants are required by the Nebraska Department of Health and Human Services regulations to inspect their plumbing systems and report any suspected or potential cross connections to the Lincoln Water System. Residential and commercial customers are notified when a "premise survey" is required. These surveys must be completed and sent back to the Lincoln Water System. All cross connections to the public water supply must be protected with a suitable backflow prevention device.

Property owners and tenants have the responsibility to ensure that no cross connections exist on their property and that they are properly protected with an approved backflow prevention device. **Property owners and tenants must have these devices tested annually to ensure proper, continuous operation.** A list of registered testers can be obtained from the Lincoln Water System by calling 402-441-5912. The cost of the test is the responsibility of the owner. For more information on the cross connection program, visit the City's website at lincoln.ne.gov (keyword: water).

In addition, City ordinance requires the installation of backflow prevention devices on lawn irrigation systems. Even though State law does not require these devices to be tested, property owners are encouraged to have the devices tested annually to protect against contamination of the interior plumbing system.

SHOULD I TRY TO CONSERVE WATER?

It is always advisable to use water responsibly. Conserving water is a good idea for many reasons - it saves you money, protects the environment and preserves this precious natural resource.

More than half of the water we use in the summer goes to outdoor use for gardens, shrubs and lawns. Mayor Beutler asks the community to conserve water by using the voluntary designated day watering schedule. Those with addresses ending in even numbers are asked to water on Wednesdays, Fridays and Sundays. Those with addresses ending in odd numbers are asked to water on Tuesdays, Thursdays and Saturdays.

Another way to conserve water outdoors is to use water-conserving plants. Recommended plants can be found in brochures developed by the Mayor's Water Conservation Task Force. Brochures can be obtained at local area nurseries. Visit the City's Web site at lincoln.ne.gov (*keyword: water*) for other suggestions.

LINCOLN'S WATER INFRASTRUCTURE

The replacement cost of all of Lincoln Water System's existing infrastructure assets totals nearly \$1.5 billion dollars. Those assets include water supply, treatment, transmission, storage, pumping, and distribution assets. Approximately two thirds of that replacement cost is attributed to the network of water distribution mains used to deliver water to customer's homes and businesses.

The cost to install a new residential water main is in the \$40 to \$50 per foot range. The cost to replace a residential water main is in the \$130 to \$150 per foot range. The extra cost for replacement is due primarily to all of the obstacles that were not present when the main was built new.

Buried utilities such as gas, electric, phone, cable, etc. require more hand work to dig around in the public right of way. Paving such as streets, driveways, and sidewalks must be restored once the new pipe is installed. Landscape material such as sod must be replaced.

Finally, once the new pipe is installed, it must be pressure tested and disinfected before all of the customers service connections are moved from the existing main to the new water main. Scheduling these replacement projects in conjunction with paving work provides an opportunity to save on some of the expenses associated with the construction work.

Likewise, the supply, treatment, transmission, storage, and pumping infrastructure must be maintained. Replacement of aging pumps and motors, reroofing facilities, repainting water storage reservoirs, replacement of electronic control and security equipment, replacement of wells are all examples of expenses that LWS incurs.

Replacement of the water mains and other infrastructure is paid for by all LWS customers through either user fees or revenue bonds (which are paid back over time with user fees). In addition, new water mains, pump stations, and reservoirs are needed to serve a growing community like Lincoln. These infrastructure improvements are also paid for by a combination of user fees, revenue bonds, and impact fees.

During 2010 the following infrastructure projects were completed:

- Completion of a new large diameter water transmission main;
- Replacement of the hardware and software for the control system;
- Replacement of the Ozone equipment that is used to treat Lincoln's water;
- Replacement of water mains in conjunction with paving projects
 - S 48th, Calvert to Pioneers;
 - "O" St, 16th to 17th, and 22nd to 28th;
 - Holdrege St, 19th to 29th;
 - "K" St, 14th to 21st.

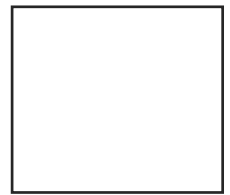
In 2011, planned projects include:

- Replacement of some transmission pumping equipment;
- Replacement of water mains:
 - S 19th, "L" to "N";
 - "N" St, 19th to 21th;
 - "N" St, 7th to 11th.

Funding for LWS infrastructure and replacement projects has been limited in recent years due to economic pressures to minimize rate increases, and due to cooler, wetter summers than in the early 2000s, which reduces water use and revenues from water use fees. The most recent 4 year average water use by LWS customers was 15% less than the previous 7 years. This results in less funding being available for replacement infrastructure projects.

LWS's six year Capital Improvements Plan can be viewed, along with the entire City of Lincoln's CIP, on the City's website at lincoln.ne.gov/city/plan/capital/10-2016/Water.pdf.

Less than \$2 million dollars of the 2010-2011 Water CIP is for infrastructure replacement. To remain a sustainable utility into the future, nearly \$7 million will need to be appropriated for infrastructure replacement and rehabilitation each year.



WHAT DOES THIS INFORMATION MEAN?

As the regulations require, we routinely test your water for numerous contaminants. These include total coliforms, turbidity, inorganic contaminants, nitrate, nitrite, lead and copper, volatile organic contaminants, total trihalomethanes and synthetic organic contaminants. The contaminants found in Lincoln's water are shown in the test results table on the inside of this brochure. The State allows us to test for some contaminants less often than once per year when the concentrations of these contaminants do not change frequently. Therefore, some of this data may be more than one year old.

The presence of contaminants does not necessarily indicate a health risk. More information about contaminants and potential health effects can be obtained from EPA's Web site at epa.gov, by calling the EPA hotline at 800-426-4791 or by calling the Lincoln-Lancaster County Health Department at 441-8000.

ARE THERE CONTAMINANTS IN OUR DRINKING WATER?

As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and can pick up substances resulting from the presence of animal or human activities. Contaminants that may be present in source water include microbial contaminants, organic or inorganic contaminants, pesticides, herbicides and radioactive contaminants. To ensure that tap water is safe to drink, the EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Although a few contaminants such as atrazine, total trihalomethanes and arsenic were detected during testing, their concentrations were well below the levels to cause health concerns.

Atrazine is an herbicide used by farmers to kill weeds in corn and grain sorghum. Atrazine is applied to the fields at planting time. When it rains, atrazine is washed from fields and enters streams, eventually finding its way into rivers.

The total trihalomethanes group includes four disinfection by-product chemicals formed when chlorine, which is added to the water to kill bacteria, reacts with naturally occurring organic matter in the water. The maximum level allowed is 80 parts per

billion. It should be noted that any harmful health effects caused by disinfection by-products are small compared with the health risks associated with inadequate disinfection.

The Safe Drinking Water standard (MCL) for arsenic is 10 ppb (parts per billion). While your drinking water meets EPA's standard, it does contain 8.9 ppb arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the cost of removing it from drinking water. EPA continues to research the health effects. It is known to cause cancer at high concentrations and other health problems such as skin damage and circulatory problems.

SPECIAL HEALTH REQUIREMENTS

While the presence of chloramines in our water is not a cause for concern among the general public, home dialysis patients, immuno-compromised individuals and aquarium owners must take special precautions before the water can be used.

For properly conditioned water for kidney dialysis equipment, make sure to contact your doctor or dialysis technician to ensure that your home equipment is adequate and proper tests are being made every time it is used.

Some people may be more vulnerable to contaminants in drinking water than the general population. This includes immuno-compromised persons such as those with cancer undergoing chemotherapy, those who have undergone organ transplants, people with HIV/AIDS or other immune systems disorders, some elderly people and infants. These people should seek advice about drinking water from their health care providers.

TO LEARN MORE

For answers to questions you may have or to learn more about the water you drink, call Jerry Obrist at 441-7571. This report and other information about water is available on the City's website at lincoln.ne.gov.

If you would like to participate in the decision-making process, please contact the City Clerk to arrange to be placed on the agenda for the regularly scheduled Monday City Council meetings.