



Only **Tap Water** Delivers



2008 Edmonton Water Performance Report

EPCOR

Only **Tap Water** Delivers

TABLE OF CONTENTS

- 4 2008 WATER HIGHLIGHTS**
- 6 WHO GETS OUR TAP WATER**
- 7 HOW CUSTOMERS USE TAP WATER**
- 9 HOW WE MAINTAIN TAP WATER QUALITY**
- 12 WATER QUALITY REPORT CARD**
- 16 LOOKING AHEAD**



EPCOR'S LONG TERM VISION

We are committed to protecting the public health through the production and delivery of high quality drinking water for all our customers.

A sustainable water utility is not only financially sound and operationally excellent, it also assumes responsibility for the environment in which it operates and is accountable to its customers and the larger community. Financial, social and environmental responsibility is the foundation for all we do.

We put this philosophy into action by following these principles:

FINANCIAL AND/OR OPERATIONAL EXCELLENCE	SOCIAL	ENVIRONMENTAL
<p>We conduct all our operations in a fiscally responsible manner to maintain sustainable water systems.</p> <p>We proactively manage all water system infrastructure through regular maintenance, evaluations and improvements.</p> <p>We continually enhance our leadership position in the drinking water industry through the development of best practices, support of research and building our staff expertise.</p> <p>We regularly assess and report the performance of our operations to identify opportunities for improvements and efficiencies.</p>	<p>We provide timely, ongoing communication with our customers and we regularly identify and engage stakeholders in many aspects of water program planning.</p> <p>We ensure our operations have emergency response plans and capabilities to deal with situations in a timely and safe manner. This is done in cooperation with health authorities, regulators and other stakeholders.</p>	<p>We provide drinking water that consistently meets all provincial regulatory requirements and strive to meet recommended guidelines and aesthetic objectives.</p> <p>We provide source-to-tap management for water system using a multiple-barrier approach, with an appropriate level of treatment based on the source water quality.</p> <p>We work in cooperation with local, provincial and federal health and environment agencies to advance industry initiatives and research to ensure long term safety and supply of drinking water.</p>

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2008 EDMONTON WATER PERFORMANCE REPORT

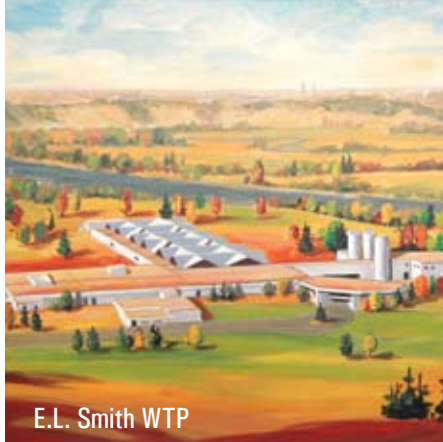
Only **Tap Water** Delivers public health, fire protection, support for the economy, and quality of life. Your tap water – it's **safe, reliable** and when compared to other water options, **very affordable**.

Your water bills pay for the stewardship of local water resources and the processes required to deliver safe and sustainable water to the community.

In order to provide Edmonton water customers with the best service possible, EPCOR Water Services Inc. (EPCOR) is required to meet performance standards in the areas of system reliability, customer service, environment, safety, and water quality. This is part of EPCOR's Performance Based Rate contract with the City of Edmonton. EPCOR has met these audited performance targets for eight consecutive years (2001–2008).

This report highlights some key activities undertaken by EPCOR in 2008.

For additional information and more detailed reports visit our website at epcor.ca/tapwater. You can also call us at **310-4300** (toll free anywhere in Alberta).



E.L. Smith WTP

Did you know...

- EPCOR tests the operation of its 17,000 fire hydrants every year.
- One penny will buy 27 cups of Edmonton tap water.



2008 WATER HIGHLIGHTS

SYSTEM RELIABILITY

- Completed construction on the multi-year E.L. Smith Water Treatment **Plant Upgrade Project** to increase the plant's capacity and reliability.
- **Cast iron water mains** are prone to breaks, so EPCOR has a long-term replacement program. Currently there are approximately 720 km of cast iron pipe remaining in Edmonton's total 3,400 km of water system.
- Due to diligent monitoring and preventive maintenance programs, our **system water losses** were below North American utility industry average of 10%.

CUSTOMER SERVICE

- All customers are **metered**.
- In 2008, **residential water rates** ranged from \$1.54/m³ to \$1.59/m³. As an incentive to use water wisely the residential rates increase with the amount of water used.
- **Commercial and Multi-Residential customers' rates** range from \$0.65/m³ to \$1.40/m³, which reflects the full cost of providing service to these groups.
- EPCOR has a 24/7 water **emergency phone line** to answer customer inquiries. It receives approximately 51,000 calls a year.
- EPCOR's **website (epcor.ca)** provides a variety of customer information including water rates, billing inquiries, water quality, water efficiency, and school education.
- A **Water Community Advisory Panel** (which includes residential, commercial, industrial, government, and environmental representatives) meets quarterly to provide input on various water issues.

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ENVIRONMENT

- EPCOR won an **Alberta Emerald Award** for environmental leadership for recent upgrades to its E.L. Smith water treatment plant.
- Partnerships continued to be a focus of EPCOR's **watershed protection** program. Some partner projects included working with the City of Edmonton on a pilot project to remove large waste items from the river, monitoring the river for presence of pharmaceuticals and personal care products in conjunction with Alberta Research Council, watershed stewardship programs with Alberta Agriculture, ongoing programs with the North Saskatchewan Watershed Alliance.
- EPCOR works researchers to **examine potential impacts** of climate change on the long term supply of our drinking water.
- Activities to promote and practice the **wise use of water** included public education and water utility "best practices" activities, such as leak detection, water loss control, and unidirectional flushing of water mains.
- Edmonton residents use **15% less water** than residents in other fully metered, large Canadian cities.
- EPCOR participated in the development of the City of Edmonton's new **Water Efficiency Fixture bylaw**.



Did you know...

- Over the last decade, the average monthly water use per Edmonton household has dropped from 20.0 m³ to 18.1 m³.
- Edmonton's two water treatment plants operated with no lost time incidents in 2008.

SAFETY

- "Spotlight on Safety" was a major component of all EPCOR programs and activities.
- EPCOR actively encourages all **staff to provide input** into safety issues and programs.
- Worked to ensure **EPCOR is in compliance with changes** to Alberta Health and Safety Codes.





Did you know...

- We had 104,500 water quality tests conducted for 353 substances.
- 54 communities and municipalities in the greater Edmonton region received tap water from EPCOR.

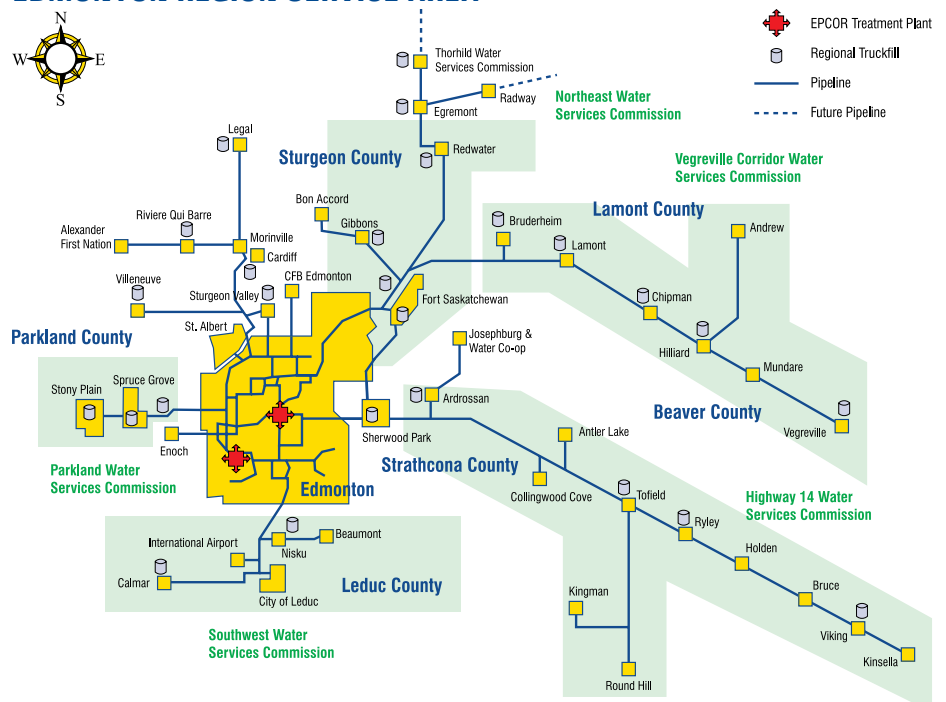


QUALITY

- Edmonton continues to receive some of the **best quality drinking water** in Canada. Our water expertise is sought by various regional, provincial, national, and international organizations.
- A **Water Quality Advisory Committee** (which includes Alberta Environment, Capital Health, University of Alberta, and City of Edmonton) regularly meets to discuss water quality and public health issues.
- **Customer satisfaction with the odour** of treated water was over 92% despite the challenging conditions of the raw water supply.
- The Edmonton **Cross Connection Control Program** ensures commercial and industrial buildings have the proper backflow devices installed to prevent accidental contamination of the public water supply.

WHO GETS OUR TAP WATER

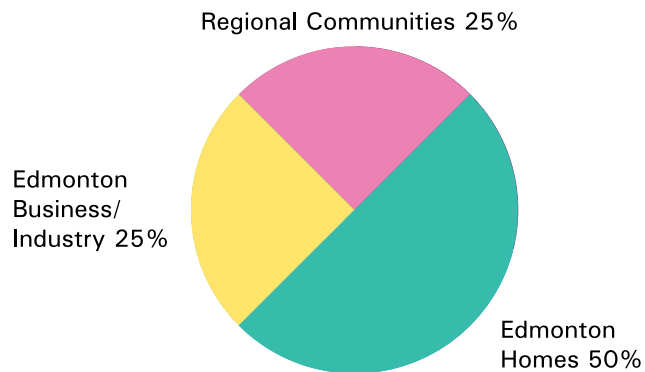
EDMONTON REGION SERVICE AREA



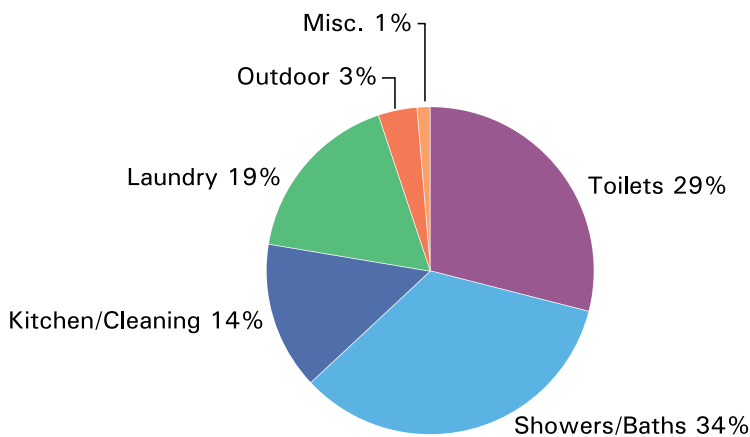
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HOW CUSTOMERS USE TAP WATER

WATER USE BY CUSTOMER GROUP



TYPICAL HOUSEHOLD WATER CONSUMPTION



Did you know...

- Our commercial customers' water uses range from building cooling to nano-technology production.
- The average North American home loses 14% of its water through leaks.



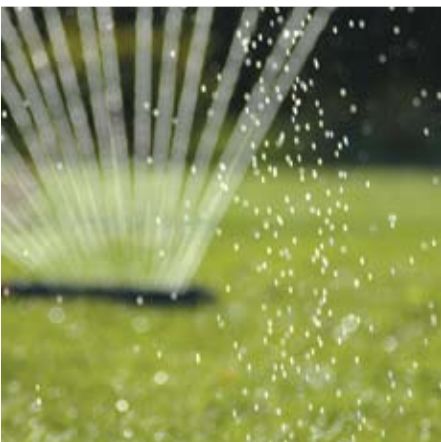
REMEMBER! BE A LEAK SEEKER

A leaking toilet can waste more than **400 litres of water each day**. Most toilet leaks are silent. To check for leaks, put a few drops of food colouring into your toilet tank. If, without flushing, the colour begins to appear in the bowl after 15–20 minutes **you have a leak**. Most internal leaks do not require a plumber to repair. Your local hardware store can assist you by recommending the best method of replacement or repair.

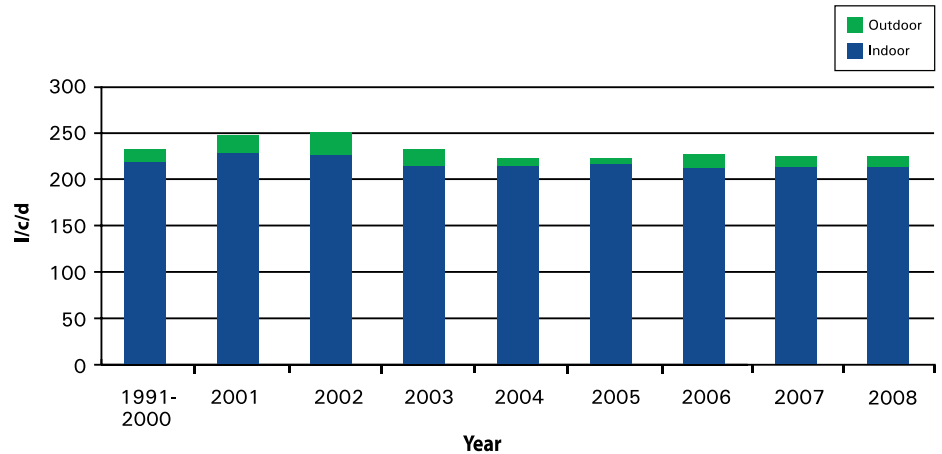


Did you know...

- A single lawn sprinkler spraying 19 litres per minute uses more water in one hour than a combination of ten toilet flushes, two 5-minute showers, two dishwasher loads, and a full load of clothes.



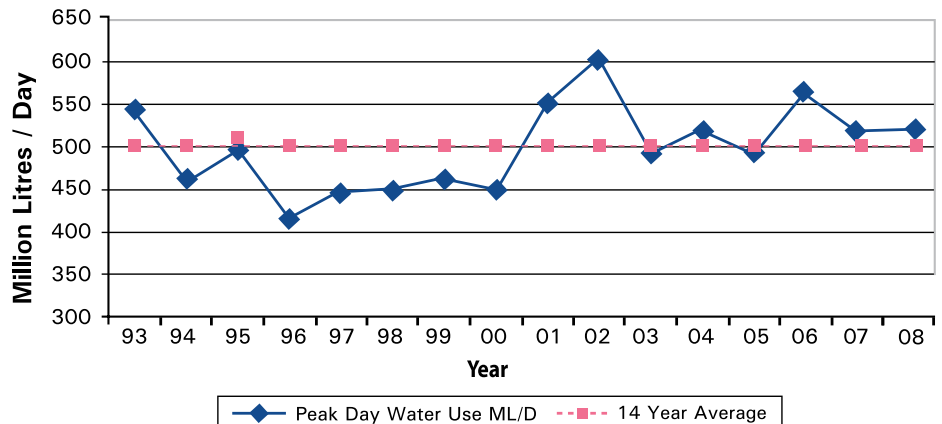
AVERAGE DOMESTIC WATER USE IN EDMONTON



In 2008, Edmonton reported one of the lowest water usage rates for domestic customers (single family homes and apartments) with an average of 224 litres per person per day (l/c/d) compared to the average of 266 l/c/d for Canadian residential customers living in large metered communities.

Edmonton has historically used less water than the Canadian average due to a city-wide metering program, rate setting methods, and relatively short summers. For example, the average Edmonton family uses about 5% of its total water demand for outdoor water use compared to 30% in the average U.S. residential home.

EDMONTON PEAK DAY WATER USE IN SUMMER (mostly due to outdoor water use)



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HOW WE MAINTAIN TAP WATER QUALITY

EPCOR maintains tap water quality by protecting the watershed, treating the raw water, managing the distribution system, reporting to regulators, and testing the treated water.

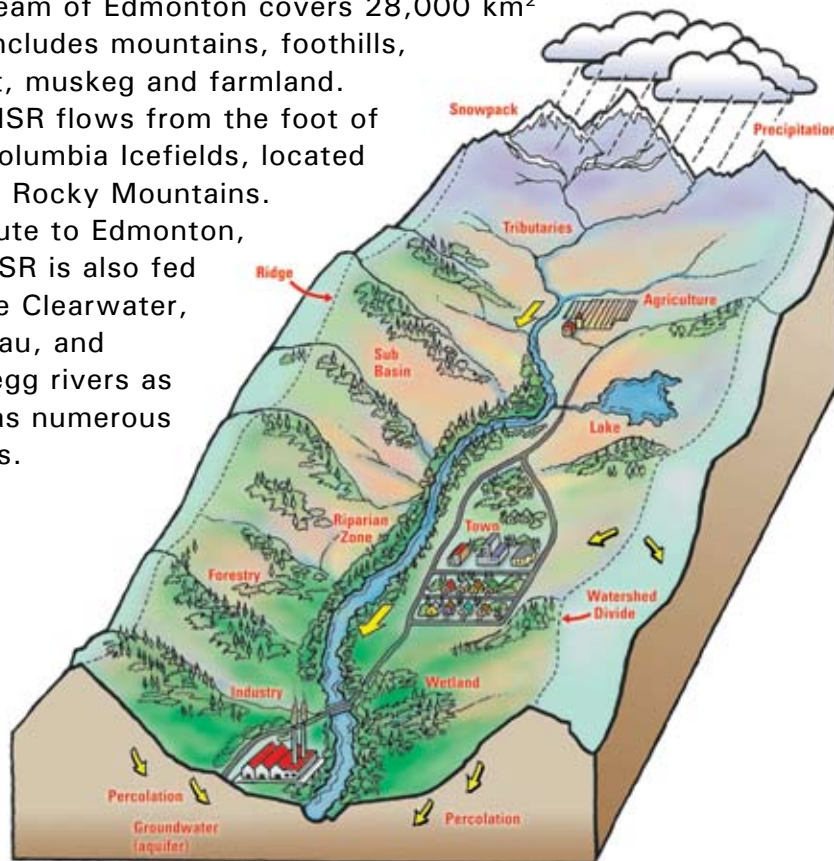
WATERSHED PROTECTION

The North Saskatchewan River (NSR) is our water supply source. **Protecting our river/water source is the first step in the multiple step approach to protecting public health.** Ensuring that the source of drinking water is as clean as possible helps to safeguard the health of our customers. We are a founding member of the North Saskatchewan Watershed Alliance, which has been appointed by Alberta Environment as a Watershed Protection Advisory Council, under the "Water for Life" Strategy.

Alberta's North Saskatchewan River Basin upstream of Edmonton covers 28,000 km² and includes mountains, foothills, forest, muskeg and farmland.

The NSR flows from the foot of the Columbia Icefields, located in the Rocky Mountains.

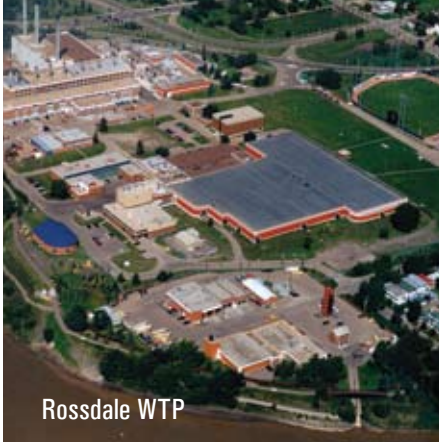
En route to Edmonton, the NSR is also fed by the Clearwater, Brazeau, and Nordegg rivers as well as numerous creeks.



Did you know...

- EPCOR sponsors the Edmonton River Clean Up program which pulled 2,300 kg of trash out of the North Saskatchewan River in 2008.

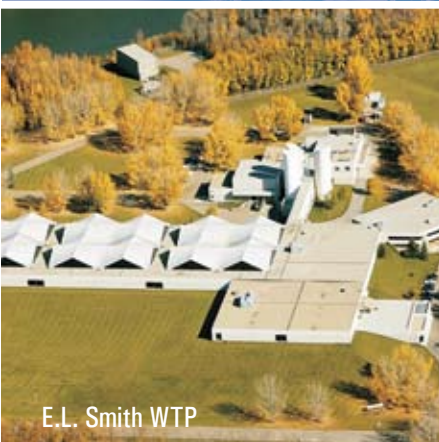




Rossdale WTP

Did you know...

- There has been a water treatment facility at our downtown Rossdale site since 1903.
- We produce enough water daily to fill a tanker train 100 kilometers long.



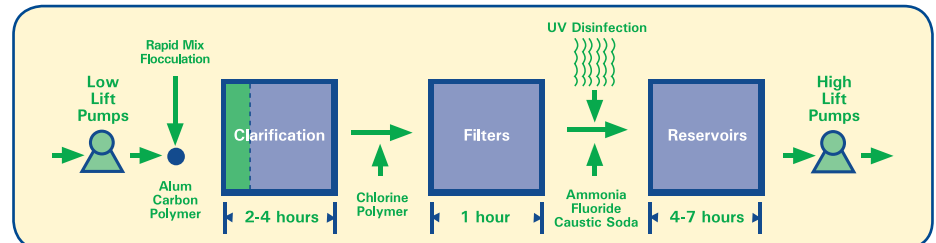
E.L. Smith WTP

WATER TREATMENT PROCESS

Edmonton's two water treatment plants (Rossdale and E. L. Smith) remove the natural and human sources of contamination from the North Saskatchewan River so that the water is safe and pleasant to drink. **Water treatment in both plants is a multi-step process.**

Clarification

- Before the river water enters the water treatment plant it flows through a set of **screens** to remove fish, leaves, and branches.
- The first step of the water treatment process is to add **alum** to help remove dirt. Like a magnet attracts iron, alum attracts dirt and silt particles. Together they form large particles called **floc**, which settle to the bottom of the clarifier.
- When floc settles to the bottom of the clarifier it is called **sludge**. The sludge is removed.
- **Activated Carbon** powder is also added to help remove taste and odour (usually most evident during spring runoff).



Disinfection/Filtration

- In the next step chlorine is added to the water. **Chlorine** is a disinfectant that kills bacteria and viruses which can make people ill.
- The water then flows through **filters** made out of fine grains of sand which trap remaining dirt and bacteria.
- After filtration, the water also passes through a series of **ultraviolet light** systems that provide additional disinfection.
- **Fluoride** and **caustic soda** are also added after filtration. Fluoride helps prevent dental cavities in people who drink the water, and caustic soda is added to adjust the pH of the water to make it non-corrosive.
- Ammonia combines with chlorine to form **chloramine** which is a long-lasting disinfectant that keeps the water safe as it is distributed to EPCOR's customers.
- Onsite **reservoirs** at the water plants hold the water for additional disinfection time. From there the water passes through the **pipes** to individual homes.

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MANAGING THE DISTRIBUTION SYSTEM

Another key to maintaining good water quality is to effectively manage the **3,400 km** water distribution system. **Ten reservoirs** are located throughout the city to help balance peak periods of water use. It is important for the water to remain fresh and retain sufficient chloramines for disinfection. A **computer model** of the distribution system helps control water movement and anticipate water quality changes. Each month we **analyze** more than 200 distribution system water samples for various substances and we follow up on customers' water quality concerns.



Did you know...

- EPCOR received a prestigious 2008 international award for the sustainable management of its water piping system.
- 99.96% of our drinking water is pure H₂O and natural minerals make up most of the other 0.04%.



REPORTING TO REGULATORS

The **drinking water quality standards** in Alberta meet or surpass the National Guidelines for Canadian Drinking Water Quality recommended by Health Canada. Alberta Environment ensures that public water systems comply with all regulations and report monitoring results from the raw water source, the treatment plants, and the distribution system. Alberta Environment regulates EPCOR with an Operating Approval which includes requirements above and beyond the Canadian Drinking Water Guidelines.

WATER QUALITY TESTING

EPCOR monitors the physical, chemical, and microbiological characteristics of your drinking water. In 2008, our water was regularly checked for 353 different physical, chemical, microbiological, and radiological substances in order to meet provincial standards and national guidelines. Over 99,000 tests were carried out internally by EPCOR's accredited laboratory, and an additional 5,500 tests were sent to external laboratories for analysis.

Plant Operators perform **additional water quality tests** for plant process control. Water quality data are also supplied by 150 electronic online analyzers which run 24 hours a day.





Water Quality Report Card

COMMON SUBSTANCES TESTED FOR IN EPCOR TAP WATER

HOW TO MEASURE

- Most substances listed are reported in **milligrams per litre** (mg/L). One milligram per litre is commonly referred to as one part per million.
- One **part per million** is equivalent to one drop in 1/2 bathtub full of water or one second in 12.5 days.
- Some substances are measured in **parts per billion**. One part per billion is equivalent to one drop in 520 bathtubs full of water or one second in 32 years.
- One part per billion is also referred to as one **microgram per litre** (µg/L).



SUBSTANCE	UNIT OF MEASURE	2008 AVERAGE	STANDARD*
BACTERIA			
Coliforms, total	P/A/100 mL	0	0
Cryptosporidium	oocysts/100 L	< 0.1	NA
E.coli	P/A /100 mL	0	0
Giardia	cysts/100 L	< 0.1	NA
CHEMICALS			
Chlorine, total residual	mg/L	1.93	< 3.0 (Approval limits 0.5–2.5 mg/L)
Fluoride ¹	mg/L	0.58	1.5 (Approval limits 0.6–1.0 mg/L)
Nitrate	mg/L N	0.04	10
Nitrite	mg/L N	< 0.005	1
Total Organic Carbon	mg/L C	1.6	NA
Trihalomethanes	ug/L	12.9	100
Bromodichloromethane	ug/L	0.7	16
MINERALS			
Alkalinity	mg/L CaCO ₃	119	NA
Chloride	mg/L	3.8	250 (AO)
Hardness, total	mg/L CaCO ₃	169	NA
Potassium	mg/L	0.8	NA
Sodium	mg/L	9.9	200 (AO)
Sulphate	mg/L	64	500 (AO)
Total Dissolved Solids	mg/L	220	500 (AO)
OTHER			
Colour	TCU (Pt/Co)	< 1	15 (AO)
Conductivity	uS/cm	373	NA
pH	pH units	7.7	6.5–8.5 (AO)
Turbidity	NTU	0.06	0.3
TRACE METALS			
Aluminum	mg/L	0.06	0.1
Arsenic	mg/L	< 0.001	0.01
Boron	mg/L	0.011	5
Cadmium	mg/L	< 0.001	0.005
Chromium	mg/L	< 0.001	0.050
Copper	mg/L	< 0.003	1 (AO)
Iron	mg/L	< 0.002	0.3 (AO)
Lead	mg/L	< 0.0002	0.01
Manganese	mg/L	< 0.001	0.05 (AO)
Mercury	mg/L	< 0.0001	0.001

* Standard = Maximum allowed under Canadian Drinking Water Guideline or Alberta Environment requirements

¹ Below approval limit due to E.L. Smith Plant being down for maintenance/upgrading for three months.

NA = Not applicable; no limits set

AO = Aesthetic objective

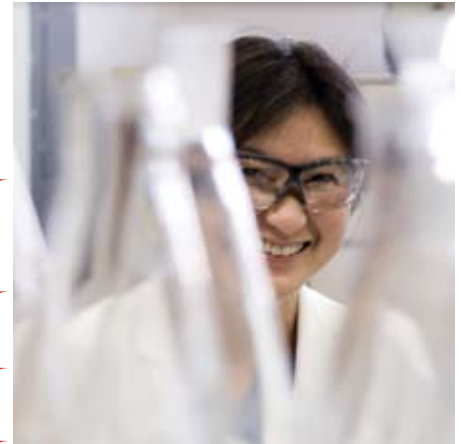
P/A = Present or absent

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REQUIRED TESTING: DETECTED IN TAP WATER

Other substances detected in tap water.

SUBSTANCE	UNIT OF MEASURE	2008 AVERAGE	STANDARD
CHEMICALS			
Ammonia	mg/L N	0.13	NA
Haloacetic acids	ug/L	15	80
MINERALS			
Calcium Hardness	mg/L CaCO ₃	117	NA
OTHER			
Temperature	deg C	7.8	15 (AO)
RADIONUCLIDES			
Gross Beta	Bq/L	0.06	1.0
TRACE METALS			
Barium	mg/L	0.06	1.0
Zinc	mg/L	< 0.003	5 (AO)



Did you know...

- Our water laboratory's expertise is internationally recognized.
- The North Saskatchewan River contains more natural hardness minerals in the winter than the summer.

VOLUNTARY TESTING: DETECTED IN TAP WATER

Other substances detected in small quantities in tap water.

SUBSTANCE	UNIT OF MEASURE	2008 AVERAGE
CHEMICALS		
Chlorate	mg/L	0.08
1,1,1-Trichloro-2-propanone	ug/L	0.9
Chloroform	ug/L	12
Dichloroacetic acid	ug/L	7.6
Dichloroacetonitrile	ug/L	0.9
Haloacetonitriles, total	ug/L	0.9
Haloketones, total	ug/L	1.2
Trichloroacetic acid	ug/L	6.1
MINERALS		
Calcium	mg/L	48
Magnesium	mg/L	13.5
Silicon	mg/L	1.8





Did you know...

- We test every material that might come into contact with your drinking water, including treatment chemicals, water mains, reservoir walls, pumping systems, and fire hydrants.



REQUIRED TESTING: NOT DETECTED IN TAP WATER

EPCOR conducted required testing for the following substances but they were absent or present in quantities too small to be detected.

CHEMICALS	PESTICIDES	RADIONUCLIDES	TRACE METALS
Benzene	2,4 - D	Cesium - 137	Antimony
Benzo(a)pyrene	Aldrin	Cesium - 134	Selenium
Bromate	Atrazine	Gross alpha	Uranium
Caffeine	Azinphos-methyl	Iodine - 125	Chromium
Carbon Tetrachloride	Bromoxynil	Iodine - 131	Cadmium
Chlorobenzene	Carbaryl	Strontium - 90	Mercury
Cyanide	Chlorpyrifos	Tritium	
Dichlorobenzene - 1,2	Cyanazine	Lead - 210	
Dichlorobenzene - 1,4	Desethyl Atrazine		
Dichloroethane - 1,2	Desisopropyl Atrazine		
Dichloroethylene - 1,1	Diazinon		
Dichloromethane	Dicamba		
Dichlorophenol - 2,4	Dieldrin		
Ethylbenzene	Dimethoate		
Methyl-t-butyl ether	Diuron		
Microcystin	Glyphosate		
Nitritotracetic acid	Malathion		
Pentachlorophenol	Methoxychlor		
Sulphide	Metolachlor		
Tetrachloroethylene	Metribuzin		
Tetrachlorophenol - 2,3,4,6	Parathion		
Toluene	Phorate		
Trichloroethylene	Picloram		
Vinyl Chloride	Simazine		
Xylene - 1,2	Terbufos		
Xylene - 1,4	Trifluralin		

VOLUNTARY TESTING: NOT DETECTED IN TAP WATER

EPCOR tested voluntarily for a large number of additional parameters but they were absent or present in quantities too small to be detected.

SUBSTANCE	TYPES TESTED
Chemicals/Physical	189
Pesticides	80
Trace Metals	16
Household Drugs	37
Radionuclides	19

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REQUIRED TESTING FOR WATER IN DISTRIBUTION SYSTEM

SUBSTANCE	UNIT OF MEASURE	2008 AVERAGE	STANDARD
Chlorine residual, total	mg/L	1.66	0.5–2.5
Trihalomethanes	ug/L	15	100
Turbidity	NTU	0.32	5
Coliforms, total	cfu/100 ml	0 (0.4% positive)	0
E.coli	P/A 100ml	0 (0% positive)	0

In 2008, water quality guidelines for the Edmonton distribution system were exceeded 17 times (12 for high turbidity, 2 for low chlorine levels, and 3 for Total Coliform bacteria). All issues were in a localized area and were remedied within 48 hours. Positive bacteria results were due to contamination at household taps, although the distribution water met water quality standards.

COMMON SUBSTANCES FOUND IN TAP WATER

Aluminum – Aluminum is naturally occurring in our river water and is found in many canned foods. Recent studies indicate a possible link between levels of aluminum and neurological diseases so Health Canada implemented an operational guideline of 0.1 mg/L in tap water. EPCOR tap water average aluminum levels were 0.060 mg/L.

Chlorine Residual – Drinking water regulations require EPCOR to maintain detectable levels of disinfectant (chlorine) throughout the 3,400 km of Edmonton's water distribution system. This is to ensure the water remains safe to drink when it finally reaches customers' taps. The maximum allowed is 2.5 mg/L and water entering EPCOR's distribution system has approximately 1.5–2.0 mg/L of combined chlorine.

Fluoride – Fluoride occurs naturally in minerals, soils, and is found in varying concentrations in natural waters. The presence of small quantities of fluoride in drinking water leads to a substantial reduction of dental cavities. EPCOR water typically contains the Federally recommended level of 0.8 mg/L. Fluoride levels in 2008 (0.58 mg/L) were low due to the E.L. Smith Plant feed system being out of service for a number of months due to major upgrades at the Plant.

Hardness – Water hardness is the result of dissolved minerals, usually calcium and magnesium. The North Saskatchewan River picks up these minerals as it flows over limestone rock. The river ranges in hardness from 147 to 238 mg/L of calcium carbonate. There are no health effects associated with these minerals. EPCOR's treated water contains an average of 169 mg/L hardness. It is harder in the winter and softer in the summer.



Did you know...

- Chlorine is the most commonly used drinking water disinfectant in North America.
- About 80% of Albertans have fluoride added to their tap water.





Did you know...

- To minimize exposure to lead and copper in your tap water, run the water until it is cold (about 2 minutes) if it has been standing in the pipes for more than 8 hours.



Nitrate – Nitrate and nitrite are common nutrients sometimes found in raw water sources. If they are present in tap water above the recommended limits they can contribute to blue baby syndrome in infants less than 6 months old. The limit is 10 mg/L and Edmonton tap water is always less than 1 mg/L.

Turbidity – Turbidity is the measure of water clarity and it reflects how well plant treatment is removing particles from the water. Turbidity is regulated because the particles can provide a place for bacterial growth and can also interfere with the disinfection process. The turbidity in the North Saskatchewan River fluctuates throughout the year. It is usually high in the spring and summer, and low in the winter. Maximum allowable level for turbidity in the distribution system is 5 turbidity units. EPCOR water is less than 1 turbidity unit in 96% of samples tested.

Lead – Lead levels are extremely low in the drinking water leaving the Edmonton treatment plants (< 0.001 mg/L) and in the distribution system. However, it may be present in tap water found in a few homes as a result of dissolution from household plumbing systems containing lead (including solder and brass fittings) or from some lead service pipes. EPCOR tested for tap water lead levels in 2300 out of 5400 Edmonton homes which still have lead service pipes.

AVOIDING LEAD IN YOUR TAP WATER

- Use only **cold water** for cooking and making baby formula.
- Use only **lead-free solder** when making plumbing repairs.
- If you replace faucets, **check the label** for lead content or possibility of lead-leaching.

LOOKING AHEAD

- There are an additional \$65 million worth of other **Capital Improvement Projects** planned for 2009.
- EPCOR will release a long term water efficiency plan for Edmonton.
- About 2.5% of Edmonton residents still have **lead service pipes** connecting their homes to a nearby water main. To ensure water quality is being maintained, EPCOR will complete sampling water from these homes and provides an ongoing program to replace these types of services. For more information about this program, contact us at **780-412-6868**.

10065 Jasper Avenue
Edmonton AB T5J 3B1
Canada

Ph: 780-310-4300
(Toll-free anywhere in Alberta)
Or visit our website at epcor.ca/tapwater

