



2009 Edmonton Water & Wastewater Performance Report





4	2009 WATER AND WASTEWATER HIGHLIGHTS
6	WHO GETS OUR TAP WATER
7	HOW CUSTOMERS USE TAP WATER
9	HOW WE MAINTAIN WATER QUALITY
12	WATER AND WASTEWATER QUALITY REPORT CARD
17	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 and responsible management of wastewater.

A sustainable water and wastewater 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 water and wastewater industries 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 and wastewater 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 and treated wastewater 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 potable water and wastewater effluent 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 of the local water supply.</p>



2009 EDMONTON WATER & WASTEWATER PERFORMANCE REPORT

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

In order to provide Edmonton 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 the audited total performance target for eight consecutive years (2001–2009).

This report highlights some key activities undertaken by EPCOR in 2009.

For additional information and more detailed water and wastewater quality reports visit our website at epcor.ca. You can also call us at **(780) 310-4300** (toll free anywhere in Alberta).



Gold Bar WWTP

Did you know...

- EPCOR's performance target is to repair at least 93% of water main breaks within 24 hours.
- One penny will buy 6.4 litres of Edmonton tap water.



2009 WATER HIGHLIGHTS

SYSTEM RELIABILITY

- The City of Edmonton transferred the **Gold Bar Wastewater Treatment Plant (WWTP)** facilities to EPCOR in spring 2009. Approximately 135 Gold Bar staff made the move as well.
- **Cast iron water mains** are prone to breaks, so EPCOR has a long-term replacement program. Currently there are approximately 703 km of cast iron pipe remaining in Edmonton's total 3,500 km water distribution 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 2009, **residential water rates** ranged from \$1.56/m³ to \$1.62/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 \$0.66/m³ to \$1.42/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 54,000 calls a year.
- EPCOR's new **Web Self-Serve** program allows all customers to manage their water and power services and accounts on-line.
- A **Water Community Advisory Panel** (which includes residential, commercial, industrial, government and environmental representatives) meets quarterly to provide input on various water issues.

ENVIRONMENT

- EPCOR's new Corporate Responsibility Report looks at the impacts the company has on the environment, customers, suppliers, employees, stakeholders and communities.
- 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, watershed stewardship programs with Alberta Agriculture and ongoing programs with the North Saskatchewan Watershed Alliance
- EPCOR supports the work of 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.
- Biogas, a by-product of the wastewater treatment process, is converted into energy at Gold Bar wastewater treatment plant. The energy is used to heat the facility resulting in over \$1million savings of annual fuel costs.

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 Alberta Health and Safety Codes.



Tame Your Grass-Guzzler

1 HOUR/WEEK keeps your lawn @ its peak!

Click to learn more

EPCOR

Did you know...

- The Gold Bar facility provides high quality reclaimed wastewater for industrial process and cooling needs.
- Edmonton's two water treatment plants operated with no lost time incidents in 2009.





Did you know...

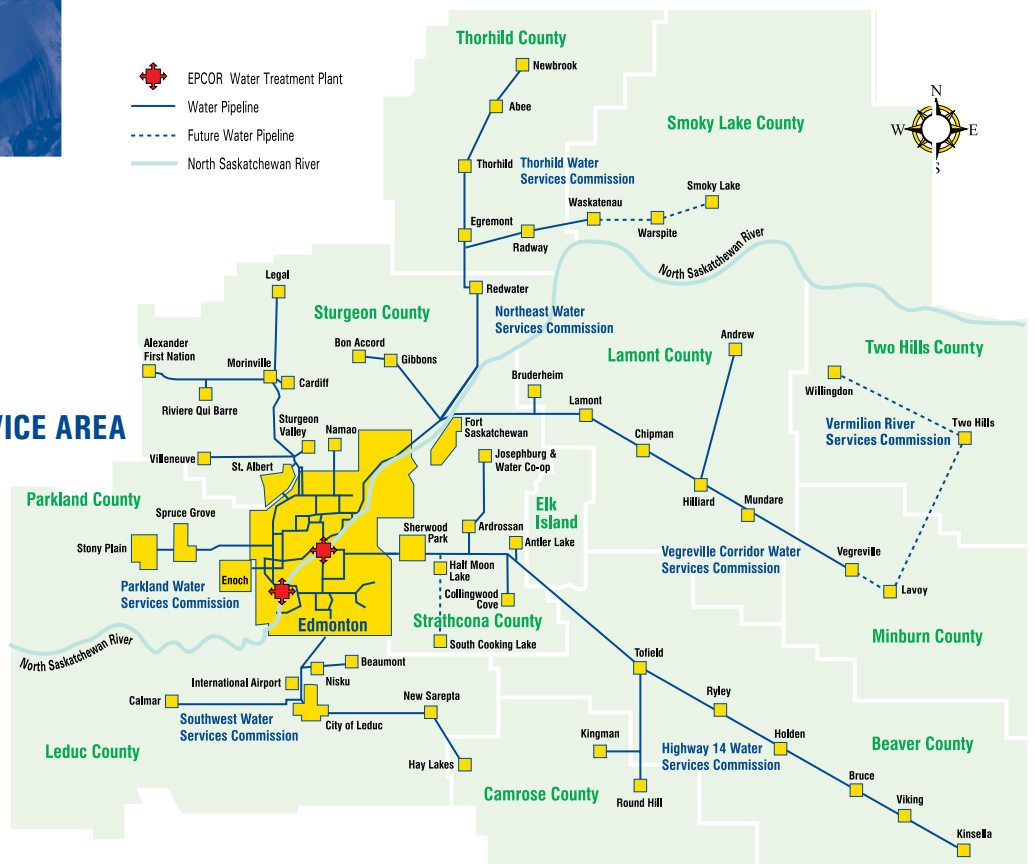
- We had 108,000 water quality tests conducted for 327 substances.
- 61 communities and municipalities in the greater Edmonton region received tap water from EPCOR.

QUALITY

- Our water and wastewater treatment **expertise is sought** by various regional, provincial, national and international organizations.
- A **Water Quality Advisory Committee** (which includes Alberta Environment, Alberta Health Services, University of Alberta, and City of Edmonton) regularly meets to discuss water quality and public health issues.
- 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.
- Gold Bar is host site of the Edmonton **Waste Management Centre of Excellence**, a research facility run by a non-profit organization.

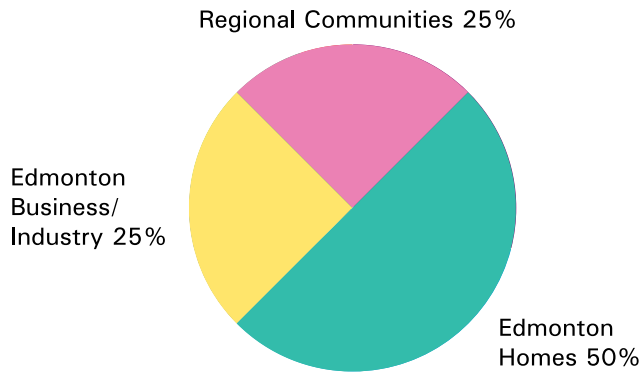
WHO GETS OUR TAP WATER

EDMONTON REGION SERVICE AREA

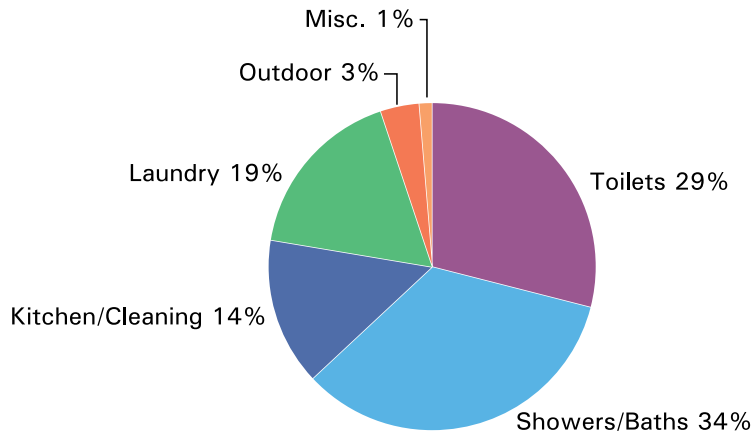


HOW CUSTOMERS USE TAP WATER

WATER USE BY CUSTOMER GROUP



TYPICAL HOUSEHOLD WATER CONSUMPTION



Did you know...

- Edmonton neighbourhoods built between 1970–1990 use more residential water than other areas.
- 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.

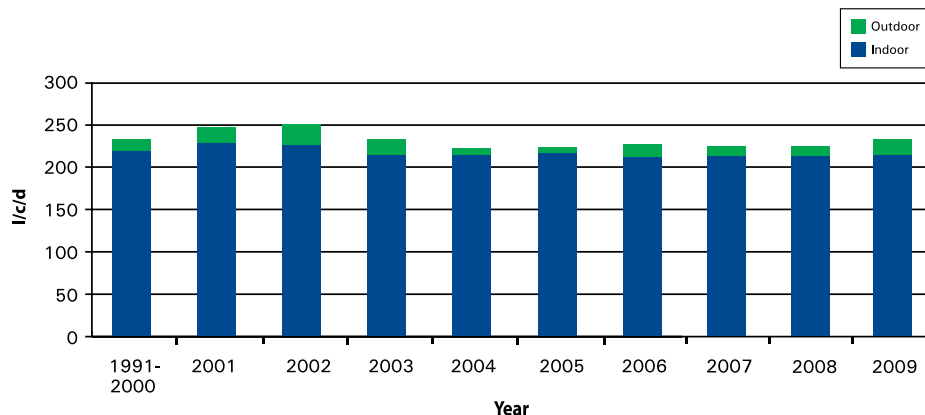


Did you know...

- 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.



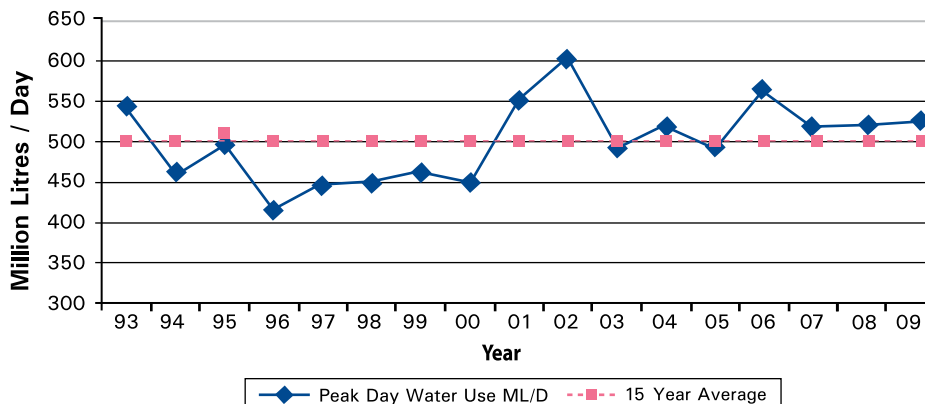
AVERAGE RESIDENTIAL WATER USE IN EDMONTON



In 2009, Edmonton reported one of the lowest water rates for domestic customers (single family homes and apartments) with an average of 223 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)



HOW WE MAINTAIN WATER QUALITY

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

WATERSHED PROTECTION

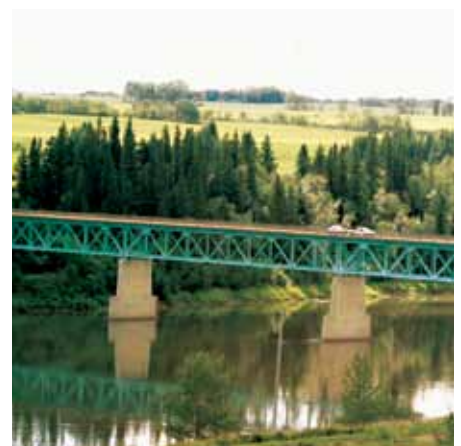
The North Saskatchewan River (NSR) is our water supply source. **Protecting our river/water source is the first step in the multiple step approach to protecting public health.** Ensuring that the source of drinking water is as clean as possible upstream and downstream helps to safeguard the health of our customers and neighbours. 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.

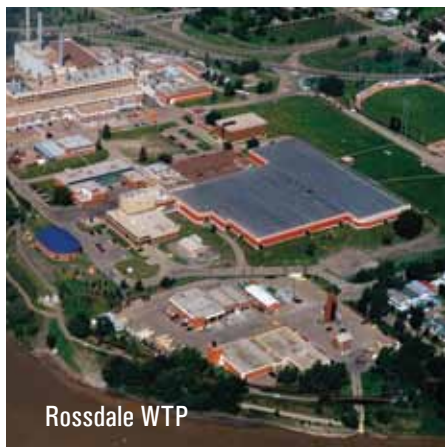
Alberta’s North Saskatchewan River Basin upstream of Edmonton covers **28,000 km²** and includes mountains, foothills, forest, muskeg and farmland. The NSR flows from the foot of the Columbia Icefields, located in the Rocky Mountains. En route to Edmonton, the NSR is also fed by the Clearwater, Brazeau and Nordegg rivers as well as numerous creeks.



Did you know...

- EPCOR sponsors RiverWatch, a science education program enabling Edmonton students to raft down a section of the North Saskatchewan River and conduct water quality tests.

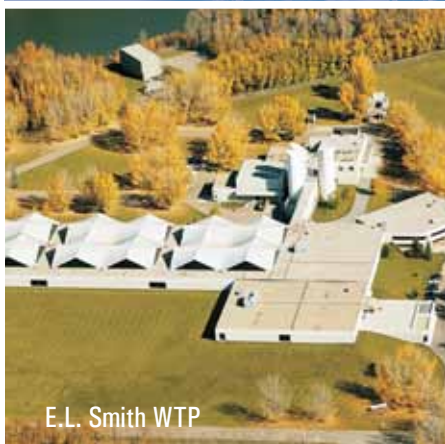




Rossdale WTP

Did you know...

- Energy is the highest annual cost item in the treatment and distribution of our drinking water.
- We produce enough water daily to fill a tanker train 100 kilometers long.



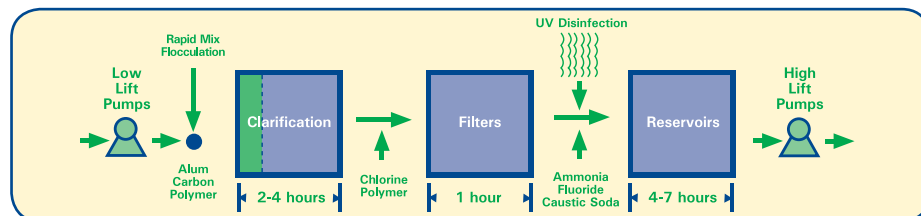
E.L. Smith WTP

WATER TREATMENT PROCESS

Edmonton's two water treatment plants (Rossdale WTP and E.L. Smith WTP) 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 lights** 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.

MANAGING THE DISTRIBUTION SYSTEM

Another key to maintaining good water quality is to effectively manage the **3,500 km** water distribution system. A control system helps control water movement and pressure in the distribution system. Each month we **analyze** more than 200 distribution system water samples for various substances and we follow up on customers' water quality concerns.

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 Approval to Operate which includes requirements above and beyond the Canadian Drinking Water Guidelines. EPCOR also has a separate Approval to Operate for the Gold Bar wastewater treatment facility.

WATER AND WASTEWATER QUALITY TESTING

- EPCOR monitors the physical, chemical and microbiological characteristics of your drinking water. In 2009, our water was **checked regularly** for **327** different physical, chemical, microbiological and radiological substances to meet provincial standards and national guidelines. Over **108,000** tests were carried out internally by EPCOR's accredited laboratory, and an additional **3,500** tests were sent to external laboratories for analysis.
- Water quality data are also supplied by about **150** electronic on-line analyzers which monitor the water 24 hours a day.
- The Gold Bar wastewater was checked for **72** different substances and over **35,000** tests were carried out by our laboratory staff.



Did you know...

- Gold Bar recovers more than \$1 million in annual fuel savings by utilizing biogas produced in the wastewater treatment process.
- 99.96% of our drinking water is pure H₂O and natural minerals make up most of the other 0.04%.





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).



* Our complete water and wastewater quality reports to Alberta Environment can be found at www.epcor.ca

SUBSTANCE	UNIT OF MEASURE	2009 AVERAGE	STANDARD**
BACTERIA			
Coliforms, total	P/A/100 mL	0	0
<i>Cryptosporidium</i>	oocysts/100 L	< 0.1	NA
<i>E. coli</i>	P/A /100 mL	0	0
<i>Giardia</i>	cysts/100 L	< 0.1	NA
CHEMICALS			
Chlorine, total residual	mg/L	1.96	< 3.0 (Approval limits 0.5–2.5 mg/L)
Fluoride ¹	mg/L	0.75	NA
Nitrate	mg/L N	0.05	10
Nitrite	mg/L N	< 0.01	1
Total Organic Carbon	mg/L C	1.4	NA
Trihalomethanes	µg/L	12.9	100
Bromodichloromethane	µg/L	0.7	16
MINERALS			
Alkalinity	mg/L CaCO ₃	118	NA
Chloride	mg/L	3.9	250 (AO)
Hardness, total	mg/L CaCO ₃	169	NA
Potassium	mg/L	0.8	NA
Sodium	mg/L	9.6	200 (AO)
Sulphate	mg/L	65	500 (AO)
Total Dissolved Solids	mg/L	216	500 (AO)
OTHER			
Colour	TCU (Pt/Co)	< 1	15 (AO)
Conductivity	µS/cm	371	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	< 0.0005	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

REQUIRED TESTING: DETECTED IN TAP WATER

Other substances detected in tap water.

SUBSTANCE	UNIT OF MEASURE	2009 AVERAGE	STANDARD
CHEMICALS			
Ammonia	mg/L N	0.07	NA
Chlorate	mg/L	0.13	0.1
Dichloromethane	µg/L	0.6	50
Haloacetic acids	µg/L	15	80
MINERALS			
Calcium Hardness	mg/L CaCO ₃	115	NA
OTHER			
Temperature	deg C	8.6	15 (AO)
RADIONUCLIDES			
Gross Beta	Bq/L	0.06	1
Uranium-234	Bq/L	0.003	4
Uranium-235	Bq/L	0.0001	4
Uranium-236	Bq/L	0.003	4
Tritium	Bq/L	19	7000
TRACE METALS			
Barium	mg/L	0.06	1.0
Mercury	µg/L	0.0001	0.001
Zinc	mg/L	0.003	5 (AO)



Did you know...

- EPCOR has 3 types of laboratories in Edmonton: water quality, wastewater quality, and research.
- 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	2009 AVERAGE
CHEMICALS		
1,1,1-Trichloro-2-propanone	µg/L	0.9
Bis (2-ethylhexyl)phthalate	µg/L	1.2
Chloroform	µg/L	10.0
Dichloro-2-propanone	µg/L	0.8
Dichloroacetic acid	µg/L	7.1
Dichloroacetonitrile	µg/L	0.9
Enrofloxacin	µg/L	< 0.02
Haloacetonitriles, total	µg/L	0.8
Haloketones, total	µg/L	1.0
n-Nitrosodimethylamine	µg/L	2.0
Norfloracin	µg/L	< 0.02
Ofloxacin	µg/L	< 0.02

SUBSTANCE	UNIT OF MEASURE	2009 AVERAGE
CHEMICALS CONTINUED		
Total volatile organics	µg/L	1.0
Trichloro-2-propanone (1,1,1)	µg/L	0.8
Trichloroacetic acid	µg/L	5.4
MINERALS		
Calcium	mg/L	47.0
Magnesium	mg/L	13.7
Silicon	mg/L	1.6



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.

SUBSTANCE	TYPES TESTED
Chemicals/Physical	27
Pesticides/Herbicides	29
Radionuclides	15
Trace Metals	8

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	82
Pesticides/Herbicides	60
Trace Metals	2
Household Drugs	36

REQUIRED TESTING FOR WATER IN DISTRIBUTION SYSTEM

SUBSTANCE	UNIT OF MEASURE	2009 AVERAGE	STANDARD
Chlorine residual, total	mg/L	1.68	0.5–2.5
Trihalomethanes	µg/L	13.0	100
Turbidity	NTU	0.44	5
Coliforms, total	cfu/100 ml	0 (0.4% positive)	0
E.coli	P/A 100ml	0 (0% positive)	0

In 2009, water quality guidelines for the Edmonton distribution system were exceeded 41 times (24 for high turbidity levels, 3 for low chlorine levels and 14 for positive total coliform bacteria). All issues were in a localized area and **remedied within 48 hours**. Turbidity of water in the distribution system is mainly an aesthetic measure rather than health related. The positive bacterial results were mainly due to contamination at household taps from which the water samples were collected. All follow-up samples were negative for coliform bacteria. All bacterial samples collected in the distribution system during 2009 were negative for *E. coli*.

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 **0.06 mg/L**.

Chlorine Residual – Drinking water regulations require EPCOR to maintain detectable levels of disinfectant (combined chlorine) throughout the 3,500 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, soil and in varying concentrations in natural waters. The presence of small quantities of fluoride in drinking water leads to a substantial reduction of dental cavities. In June 2009, EPCOR reduced the target concentration of fluoride in drinking water from 0.8 to 0.7 mg/L in response to a revised recommended level proposed by Health Canada. Our average fluoride concentration for 2009 was **0.75 mg/L**.

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 128 to 195 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.

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 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 distribution system samples tested.



Did you know...

- Edmonton tap water is considered "moderately hard."
- About 80% of Albertans have fluoride added to their tap water.





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 in lead service pipes. EPCOR tested for tap water lead levels in most of the **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.

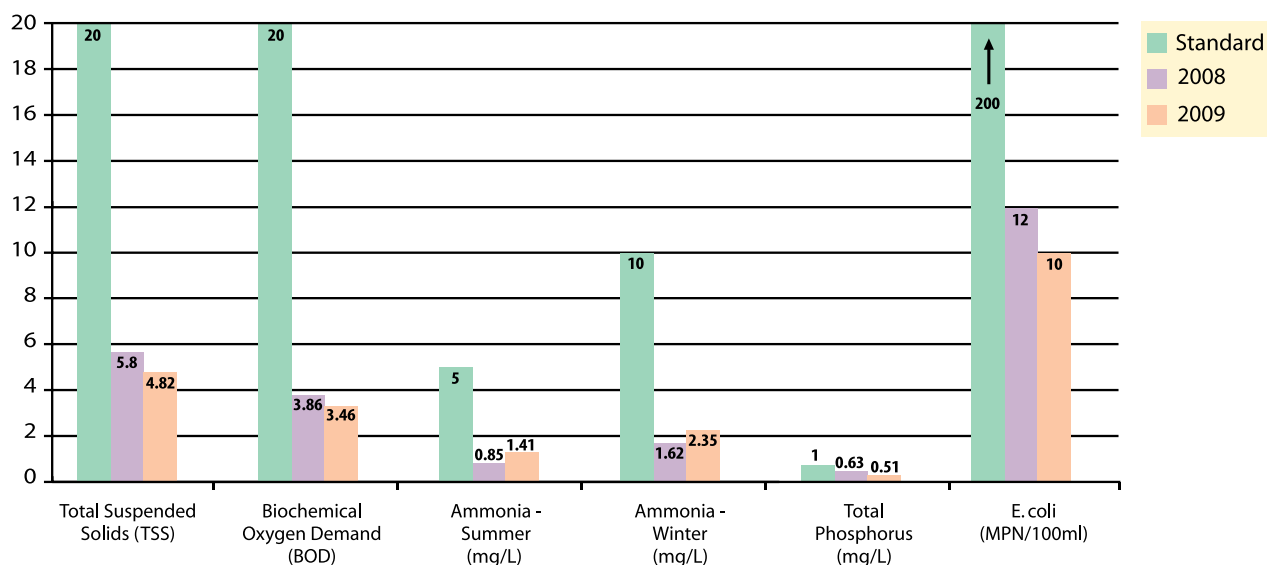
Did you know...

- To minimize exposure to lead and copper in your tap water, run the water for a few minutes (or flush the toilet/ take a shower) to clean out your plumbing after periods of no water use.

WASTEWATER QUALITY TESTING

The treated wastewater discharged to the North Saskatchewan River from Gold Bar WWTP met all Alberta Environment standards in 2009.

REQUIRED TESTING: GOLD BAR WASTEWATER TREATMENT PLANT FINAL EFFLUENT RESULTS





LOOKING AHEAD

- There are an additional \$92 million worth of water and wastewater **Capital Improvement Projects** planned for 2010.
- EPCOR will release a **long term water efficiency plan** for Edmonton.
- An **environmental upgrade** will begin on the Rossdale plant process that will remove chlorine from any waste materials returning to the river from the treatment process.

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

