THE CITY OF Penticton

WaterTalk

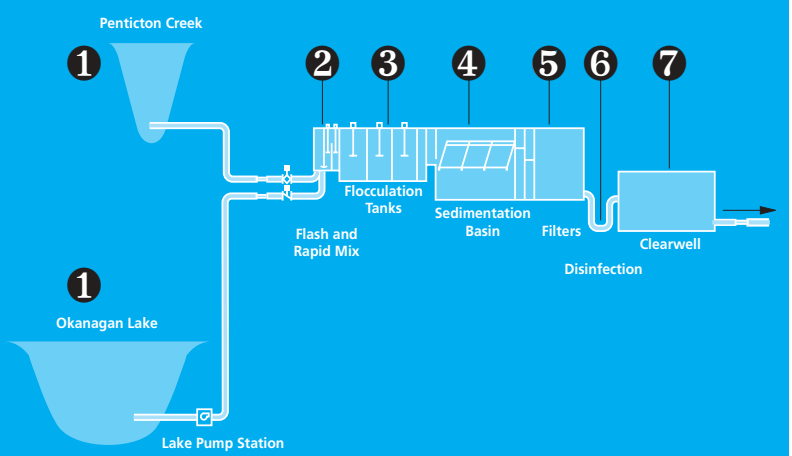
Spring 2004

Penticton water treated with care

Built in 1996, Penticton's water treatment plant uses a multiple-barrier treatment system to guarantee safe drinking water for the City's 33,000 residents. As shown in the schematic at right, treatment consists of coagulation, flocculation, sedimentation, filtration, and disinfection.

The plant was designed to treat water from Penticton Creek, which is highly coloured, and Okanagan Lake, which has low turbidity. Dual water sources provide Penticton with excellent operational flexibility. Modern control and instrumentation systems are used to monitor treatment plant operations. Leading-edge supervisory and data acquisition systems allow City staff to monitor remote water supply facilities from the water treatment plant. Backup systems are in place to deal with equipment or power failure. The water treatment plant has a backup power generator which makes the plant self sufficient during power outages. ■

Treatment Process



❶ Intake

Large objects such as logs and plants are screened out as water is drawn to the treatment plant from Penticton Creek or Okanagan Lake. Creek water is fed to the plant by gravity from a reservoir behind the plant. Lake water is pumped to the plant from a lakeshore pump station.

❷ Mixing

Water arrives at the treatment plant and travels into rapid mixing tanks, where coagulants (chemicals that cause fine particles to clump together, forming "floc") are added. Mixing disperses coagulants throughout the water and starts the coagulation process.

❸ Coagulation and Flocculation

Water passes through flocculation tanks where it is gently mixed. Particles come into contact with each other and form larger floc. It is during this stage that the majority of impurities and harmful bacteria are confined within the floc particles, and will later settle out or be captured in the filters.

❹ Sedimentation

Water enters the sedimentation basin where velocity is slowed, allowing floc particles from the previous process to settle onto inclined plates. Floc settles to the bottom of the basin, removing impurities from the

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Welcome to WaterTalk!

WaterTalk is produced by the City of Penticton to promote water-use efficiency and to educate customers about water-related legislation, programs, projects, and services. To be published spring and fall, *WaterTalk* is part of an Okanagan-wide initiative supported by the province and more than 15 other water utilities. For more information contact Brent Edge at 250-490-2560 or **wtp@penticton.ca**

B.C. promises safe drinking water

In an October 2002 press release, Victoria promised "the most effective drinking water protection in Canada." The government set out to accomplish this monumental task by making several amendments to the *Drinking Water Protection Act* (DWPA). The act was passed by the NDP government in 2001, just prior to the last election. However, in order to enforce the act, regulations were required. The Liberal government took steps toward enforcement by initiating a review process of drinking water standards, taking recommendations from that review process and incorporating them into an amended DWPA. These amendments were finalized in May of 2003. Following are outcomes of the amended act:

- Medical Health Officers (MHOs) in each of B.C.'s five health regions have appointed Drinking Water Officers (DWOs) to oversee source-to-tap assessments of all drinking water systems. DWOs, under the auspices of the MHOs, will also monitor operational standards to ensure safe drinking water.
- Regulations require all water system operators to be certified under the Environmental Operators Certification Program.
- Water suppliers will be responsible for ensuring that water samples are taken according to their operating permits, and tested by an approved laboratory.
- Water suppliers must have an emergency response plan, and must make a summary of the plan available to their customers.
- Compliance with the new act and regulations will be monitored by health authorities.

View the entire DWPA online at www.qp.gov.bc.ca/statreg/stat/D/01009_01.htm

Interior Health

Interior Health (IH) represents one of five health regions in B.C. and encompasses the following Health Service Areas (HSA): Thompson-Cariboo Shuswap, East Kootenay, Kootenay Boundary, and Okanagan. The IH is pleased to announce the creation of a Drinking Water Team in its Health Protection Division. This team will be working closely with the health region's 1300 water suppliers to ensure compliance with the Drinking Water Protection Act and corresponding regulations. Team members include Elizabeth Sigalet, Manager, Drinking Water, IH (250-851-7338); and the following Drinking Water Officers: Robert Rippen, Thompson Cariboo Shuswap HSA (250-851-7345); Dan Byron, East Kootenay HSA (250-426-1481); Serge Zibin, Kootenay Boundary HSA (250-354-6838); and Mike Adams, Okanagan HSA (250-549-6348).

Buyer Beware!

Okanagan water utilities have received complaints about door-to-door salespeople using scare tactics to sell in-home treatment devices. The sales pitch goes like this…

You find an empty plastic bottle on your doorstep with a note offering a free water quality test. To your horror, the test reveals your water is "poisoned" with herbicides, pesticides, manure, and even germs from foreign countries! The salesperson says you could be risking your loved-ones' lives by drinking the water. You're then told you can remove the "poison" by purchasing an in-home reverse osmosis filtration system. The cost? Anywhere from $2,000 to $4,000.

The heart of the sales pitch is a test known as a water pollution indicator test or a TDS (Total Dissolved Solids) test. The salesperson inserts two probes into a sample of your tap water and the water turns brown instantly. The brown particles, he tells you, could pose health risks.

In reality, however, test results are contrived by the salesperson to frighten you. Here's how it really works: The probes (one iron, the other aluminum) are connected to a battery and placed into your water sample. Because water contains dissolved minerals like calcium and magnesium, the probes create an electrical reaction. Iron from the probe falls off and turns your water brown. The salesperson then inserts the probes into a sample of water treated by reverse osmosis (RO). Not surprisingly, the water stays clear. This is because the RO system removes all minerals from the water. No minerals, no electrical reaction.

Unfortunately, this test has convinced many people their tap water is unfit to drink, and has prompted them to buy expensive treatment devices that sometimes don't work or are unsuitable for their water.

What to do...

If you are concerned about the quality of your tap water, contact your water utility. Staff can provide you with current water quality monitoring results or recommend a laboratory for reliable testing.

If you choose to proceed with treatment, explore your options carefully. There are many systems that might meet your needs, including point-of entry (filter at service entry), point-of-use (filter at tap), carbon filtration, distillation, and reverse osmosis.

Whatever system you choose, follow installation and maintenance directions carefully. Poorly maintained units provide a breeding ground for bacteria, and can actually pose serious health risks.

Drying Times

Whether you're a farmer with a quarter-section of hay, an orchardist with 30 acres of apple trees, or a city resident with a few square feet of garden space, the word "drought" has likely become an important part of your vocabulary in recent years. Drought can be generally defined as a deficiency of precipitation over a season or longer. British Columbia has experienced drought conditions for the past four years in a row.

In 2003, the Okanagan, with its already semi-arid climate, was hit particularly hard by hot weather and lack of moisture. The cumulative effects of drought over the previous three years resulted in low reservoir, stream, and lake levels. Crop yields plummeted, and our bone-dry forests endured several major wildfires.

The outlook for 2004 is slightly less bleak than it was in 2003. As of February 1, the snow water index for the Okanagan and Kettle basins stood at 96 percent of normal levels, and precipitation during January was well above normal. However, Okanagan Lake is still at its lowest level in 83 years, and a good snowpack doesn't mean the danger of drought has passed. We still need adequate precipitation throughout the spring and summer months. What to do? Expect drought, but hope for rain.

So what's being done to prepare for the worst? The provincial government has implemented a Drought Management Action Plan, which outlines basic measures for conserving water and monitoring water quality during drought. Here are some of the plan's highlights:

- Monitor surface and groundwater levels over the winter;
- Assess the adequacy of water supply for the summer of 2004 by April 30, 2004;
- Where necessary, request communities and water suppliers to develop "reduced supply" plans; and
- Ensure that water suppliers and health authorities monitor sources to maintain a high level of drinking water quality during times of reduced supply.

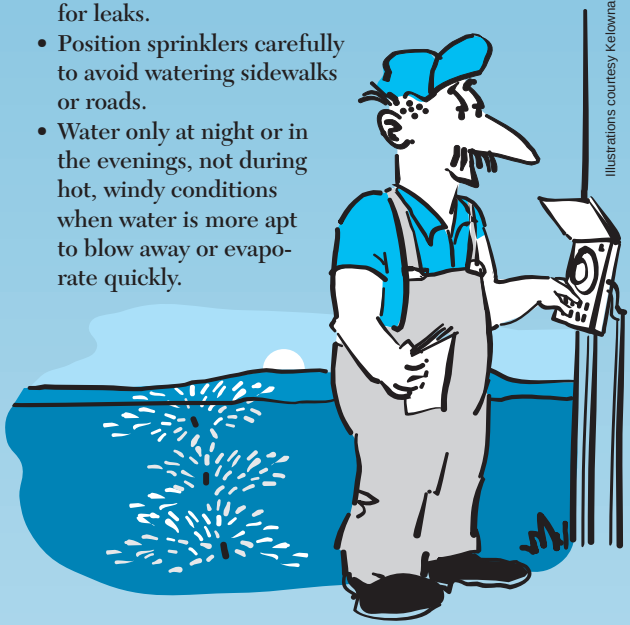
The complete Drought Management Action Plan is available for public viewing online at **http://lwbc.bc.ca/drought/action_plan.pdf**

Doing Your Part

Now you know what the government is doing. Here's what you can do. If you have a large-scale irrigation system the most effective way to conserve water is to use high quality irrigation systems that have been installed by certified professionals. Visit the Irrigation Industry Association of BC website for more information: www.irrigationbc.com.

If your watering needs are limited to a city lot and/or small garden, try these steps:

- Become familiar with the water needs of your trees, shrubs, flowers, and grass.
- Plant drought-resistant varieties of plants.
- Adjust automatic sprinkler systems to deliver less water to shady zones.
- Check hoses, couplings, faucets, and pipes for leaks.
- Position sprinklers carefully to avoid watering sidewalks or roads.
- Water only at night or in the evenings, not during hot, windy conditions when water is more apt to blow away or evaporate quickly.



Illustrations courtesy Kelowna Joint Water Committee

- Avoid watering in anticipation of a shortage — soil cannot absorb extra water anyway.
- Use organic matter and mulch covers to retain moisture and prevent evaporation.
- Adhere to guidelines set by your water supplier.

Meet Wally and Wanda

Wally and his granddaughter Wanda want you to use water wisely! Developed by the Kelowna Joint Water Committee in the mid-1990s, Wally and Wanda are now spokespeople for efficient water use throughout the Okanagan. The committee has been working since 1991 to promote water-use efficiency and to develop cooperative strategies among the five major water suppliers operating within City of Kelowna boundaries.

Balancing irrigation and conservation

Are you sure your irrigation system is not wasting water? We live in one of the hottest and driest parts of Canada, with a limited water supply. While your irrigation system may seem small and insignificant, collectively these systems use a majority of the domestic water supply during the dry summer months.

The primary cause of water wastage with irrigation systems is design—bad design. It is impossible to operate a poorly-designed irrigation system efficiently. A poorly-designed irrigation system will have mismatched sprinklers and an assortment of incompatible components. Often there are too many sprinklers operating at one time, which results in reduced pressure and inefficient water distribution. Different plant species and areas with varying water requirements are often irrigated on the same zone (a group of sprinklers controlled by one valve). These design practices are only a few of the factors that will result in the non-uniform application of water. Poor uniformity results in the irrigation system operating for a longer period of time to ensure all of the landscaped area receives enough water. Irrigation systems with poor uniformity can require up to eight times more water than a similar system with good uniformity.

To address the problem of shoddy workmanship, the Irrigation Industry Association of BC (IIABC) has developed programs to measure the skills of irrigation contractors. The IIABC has Certified Residential and Certified Commercial Irrigation Contractor programs. To become a Certified Irrigation Contractor requires a minimum of three years' experience installing irrigation systems and the successful completion of several courses, including the IIABC's Certified Irrigation Designer Program. Generally, it takes an irrigation contractor three to five years of study to obtain accreditation. Once certified, the contractor must adhere to a strict Code of Ethics.

The IIABC is committed to water conservation by means of efficient irrigation design and installation procedures. For further information on the IIABC programs or membership, call 604-859-8222 or visit our website at **www.irrigationbc.com**.

Operating Conditions required by Interior Health

In May of 2003, the *Drinking Water Protection Act* (DWPA) and corresponding regulations were brought into force to modernize drinking water protection in B.C. Overseen by the Ministry of Health and its newly appointed drinking water officers in each of the province's five health regions, the act requires:

- certified operators for water systems,
- more thorough water system assessments, and
- ongoing water quality monitoring and reporting.

In the Okanagan, for example, Interior Health (IH) has applied the following conditions to the operating permits of water systems serving more than 1,000 people. They are required to:

Provide certified operators

Certified operators are trained to ensure water intended for drinking is collected, treated, and distributed in accordance with current industry and health standards. All City of Penticton operators are certified Level III water treatment operators through B.C.'s Environmental Operators Certification Program. The City is working toward upgrading our operators to Level IV certification.

Provide a drinking water sampling program

Ongoing water sampling assures a utility that the water it delivers is safe for drinking. It also provides invaluable information upon which the utility can base current and future collection, treatment, and distribution decisions. The City has developed a sampling program that assesses the quality of water delivered to customers and reports the results of these tests to IH.

Provide continuous on-line turbidity sampling and recording of raw water for each surface source

Cloudy or turbid water is caused by the presence of very fine suspended particles. In addition to being unpleasant, turbidity reduces the effectiveness of the chlorine used to kill bacteria. The City introduced continuous on-line turbidity sampling and recording in November 1996 as part of water treatment plant construction. Results show that the water leaving the treatment plant had turbidity of 0.027 NTU (average for 2003) and a peak yearly high turbidity of 0.268 NTU on April 26, 2003. *The Guidelines for Canadian Drinking Water Quality* recommend a maximum acceptable concentration for turbidity of 1.0 NTU.

Provide continuous on-line monitoring of the disinfection process

The DWPA requires all surface water sources intended for drinking to be disinfected. Disinfection with chlorine inactivates microbes (e.g. bacteria, viruses), prevents bacterial regrowth and reduces health risk from accidental contamination. The City introduced continuous on-line monitoring of the disinfection process in November 1996. Results show that the average chlorine residual of water leaving the treatment plant was 1.02 mg/L in 2003, well within the required levels prescribed by IH.

Perform *Giardia* performance monitoring calculations as prescribed by the public health engineer

Giardia is a parasite introduced into water supplies by human and animal activity in watersheds. *Giardia* cysts (which cause Beaver Fever) are sometimes present in raw water, but are rendered harmless if adequate contact time with chlorine is maintained. The City's water treatment plant process successfully controls *Giardia*. In 2003 there were twenty-five instances, during which chlorine contact time was insufficient. These occurrences were the result of unusually

high water demands during peak hours, and lasted for periods of less than four hours. IH is aware of these events and accepts the fact that they will occur occasionally.

Provide a cross-connection control program

A cross connection is any physical link between a potable (drinking) water system and a non-potable liquid that can allow the contaminated liquid to enter the drinking water system through backflow. A cross-connection control program requires backflow prevention devices and regular testing to prevent contamination. The City introduced a cross-connection control program in April 2003. The program has addressed all City infrastructure and is now addressing private facilities.

Provide a well protection plan for each well source

The City is developing a well protection plan, which will be submitted to IH when completed by the consulting engineer. Actions recommended in the plan will be addressed.

The City maintains a backup supply well, which draws water from the Warren Avenue aquifer. This is a backup water source that has not been operated for several years. The City is evaluating future demand requirements, and the Warren Avenue well may be reactivated during peak summer demands.

Review and update emergency response plan annually

The DWPA requires each water supplier to have a written emergency response and contingency plan "to be implemented in the event of an emergency or abnormal operation circumstances affecting its water supply system or drinking water source." Included in each plan is a communication strategy outlining when and how the utility will inform all stakeholders of a potential emergency. The City is updating its emergency response plan continually with input from IH. The City's emergency response plan was submitted to IH in April 2004.

Provide long-term plans for source, treatment, and distribution system improvements

All systems must look ahead and plan for upgrades that will meet future treatment and development needs. To that end, the City is conducting a short-term evaluation of the infrastructure needed to meet future demands. Proposals will be invited from engineering firms this spring to evaluate and recommend strategies to meet growth expectations for the next five, ten, and 15 years.

Report prescribed monitoring results to the public health engineer monthly

The City meets all IH monitoring requirements. By performing 4,900 monitoring tests in 2003, it is operating well within the parameters of its water license.

The City provides a monthly summary of its ability to control *Giardia* with chlorine. Additional monthly reports include the following: daily water consumption, turbidity, biological test results, chlorine residuals, and comments on source, treatment, and distribution system events. ■

For more information about these operating conditions, please contact the City's water quality manager at 250-490-2551.

Treatment Process

Continued from page 1

water, which then proceeds to filtration.

❺ Filtration

Penticton's deep-bed, mono-media filters are among the first of their kind to be used in Canada. The filter material used is anthracite coal at a depth of 1.8 metres. As water passes through the filter, impurities are removed. The number of filter washes required is directly related to the amount of water processed through the filter and its quality. Filter backwashes are regulated by three factors: time that a particular filter has been online, turbidity or particle counts, and headloss (the amount of energy required for the water to pass through the filter media). The quantity of treated water increases dramatically during July and August, when rainfall is reduced and temperature and irrigation use increase.

❻ Disinfection

Once impurities have been removed from the water, chlorine is added as a disinfectant. This ensures the water is safe for drinking and prevents pathogens from developing as it travels from the treatment plant to the customer. The plant has five chlorinators that can inject chlorine at the following stages: pre-treatment, pre-filtration, post-filtration, pre-clear well, or post-clear well.

❼ Distribution

Finished water is stored at the plant in a large reservoir called a clear well, and throughout the City in five additional storage reservoirs. There are about 160 kilometers of water mains, more than 900 fire hydrants, and 9,000 connections serving a population of 33,000 people. Staff routinely sample water at locations within the distribution system to ensure the water meets all health standards. The City performs about 400 bacteriological tests each year. ■

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Published by
THE CITY OF Penticton
171 Main Street, Penticton, B.C. V2A 5A9
WATER TREATMENT PLANT
PHONE: 250-490-2560
FAX: 250-490-2561
EMAIL: wtp@penticton.ca
WEBSITE: www.penticton.ca