



City of Castlegar

REPORT TO COUNCIL

DATE: February 21, 2008

REPORT NO.: 08-22

SUBMITTED BY: Chris Cochran, DTCW

FILE NO.: 5600-50

SUBJECT: **Drinking Water Annual Report - 2007**

RECOMMENDATION

That Council receive for information and endorse the City of Castlegar Drinking Water Annual Report for 2007.

INTRODUCTION

The City of Castlegar is the purveyor of drinking water to users connected to the Castlegar Water System. This report is provided to City Council for their information, and in fulfilment of the City's obligations under the Provincial Drinking Water Act and associated regulations, as well as the terms and conditions of the City's Water System Operating Permit. Enforcement of the regulations and issuance of water system permits is the responsibility of the Interior Health Authority's Drinking Water Officer.

WATER CONSUMPTION

Raw water for the City of Castlegar water system is pumped from the Lower Arrow Lake through an intake shared with the Zellstoff Celgar Pulp Company.

The following consumption statistics reflect **total usage** trends in Castlegar from 2006 to 2007:

- ? Total consumption for 2007 was 784,472,922 US Gallons (gal).
 - o This represents a 6% increase in overall water consumption from 2006.
- ? Maximum daily demand was 5,410,900 gal on July 14, 2007.
 - o This represents a 4% increase from 2006.
- ? Minimum daily demand was 1,177,623 gal on March 23, 2007

The estimated breakdown of total annual water use by sector is as follows:

- ? Industrial, Commercial and Institutional (ICI) - approximately 16%,
- ? Domestic (in-house) - 31%,
- ? Domestic (irrigation) - 38%,
- ? Parks Irrigation – 3%,
- ? Leakage/Unaccounted Use – 12%.

Rationale used in the determination of demand allocation by sector may be found in the appended Urban Systems memorandum titled “City of Castlegar Water Usage”.

The following domestic water consumption statistics reflect **household usage** trends in Castlegar from 2006 to 2007 (Note that census numbers for 2007 were extrapolated from existing Statistics Canada information for consideration in the domestic demand calculations):

- ? Total consumption for 2007 was 73,866 gal per person.
 - o This represents a 5% increase from 2006.
- ? Maximum daily demand was 509 gal per person.
- ? Minimum daily demand was 111 gal per person.
- ? The average daily demand was 202 gal per person.
 - o Average daily demand in Canada is only about **141** gal per person.

In summary, total consumption increased approximately 6% in 2007 from 2006 within Castlegar. While the number is a marked increase over the period of 2005 to 2006, the following factors likely contributed to the increase:

- ? Bulk water use including:
 - o Two large subdivision developments’ water usage for construction purposes,
 - o Continuation of the watermain flushing program,
 - o Bulk water supply for parking lot washing,
 - o Fire fighting practice sessions including truck pump tests,
 - o Hydrant vandalism.
- ? Municipal park irrigation line breaks and leaks.

The following measures would aid in increasing the municipalities ability to quantify the portion of increased water consumption attributable to non-residential or “unaccounted for” usage:

- ? Diligent recording of bulk water sales and elimination of un-metered/unauthorized water drawn from hydrants.
- ? Increased use of meters in municipal parks coupled with timely leak repairs and reduced irrigation in select areas.
- ? Maintaining a \$1,000 reward for information leading to hydrant tampering (including un-authorized use).

SOURCE WATER QUALITY

A surface water source the size of Lower Arrow Lake is difficult to fully secure, but the sheer volume of the lake, as well as the location of the intake, contribute to ensuring the high quality raw water source the City enjoys.

Source water is tested a number of times each year for a variety of characteristics from the presence of metals or chemicals to its clarity (turbidity), acidity (pH) and temperature. A complete list of the test elements is included as Appendix 'A' to this report. The quality of the City's raw water source is indicated by the fact that none of the tested parameters have or now do exceed the limits of regulated, or generally accepted, standards for raw water quality.

TREATMENT

Castlegar's water system has a single treatment barrier in place at this time and that is chlorine gas disinfection. Prior to water entering the City's distribution system, i.e. before the first drinking water user, chlorine gas is injected into the water at the Water Treatment Centre. The disinfection equipment provides sufficient dosage to the water at both high and low flow periods to ensure an appropriate, and compliant, level of residual disinfection capability is maintained throughout the distribution system. The dual Capital Controls chlorinators can provide 0-10 lbs per day during low water flow periods and 10-100 lbs per day during high demand.

The chlorine disinfection system is maintained by City staff trained to operate the systems, provide scheduled maintenance/overhaul services, as well as do repair work as required. A stock of extra parts and equipment, as well as quick-connect plumbing and electrical connections ensure complete redundancy of the system at all times, to minimize the chance of extended breakdowns.

A 5 hp Variable Frequency Drive (VFD) controlled chlorine injection pump was added to complement the two existing injection pumps and a second VFD pump is planned for 2008. The VFD pumps are designed to overcome excessive mainline pressures when Celgar's process water demand is reduced. These pumps will ensure that a continuous stream of chlorine solution is injected into the mainline under any reasonably foreseeable operating pressure condition.

QUALITY MONITORING

Drinking water delivered to users of the City system is subject to a comprehensive and rigorous testing program that ensures quality drinking water. Continuous monitoring of chlorine residual readings, temperature and pH in the drinking water is accomplished with Endress & Hauser (EH) meters located at the Water Treatment Centre (disinfection takes place here), at the Meadowlark Pump house (mid system) where distribution of drinking water to other parts of the City is initiated, and at the physical end of the distribution system in Blueberry.

On a daily basis City staff test samples of drinking water from five separate locations for chlorine residuals (i.e. the presence of chlorine in the water). These tests are conducted with

hand-held Hach meters that measure the minute amounts of disinfectant that must be in the drinking water throughout the system to meet regulations. Sample points are located at the start, middle and end of the entire City water distribution system to ensure the effectiveness of the disinfection program. At least 0.2 milligrams of chlorine must be present in every litre of water to meet these standards. Results are downloaded into the City's water quality database, WaterTrax? .

? **1,544 manual chlorine residual tests were conducted by City staff in 2007 at the 5 locations.**

Water samples are sent, on a weekly basis, to the *Caro Environmental Services* laboratories to be tested for total coliform bacteria as well as presence/absence of *E. coli*. City staff draws these samples and sends them to the Kelowna laboratory. Results are downloaded by *Caro* directly into the City's WaterTrax? system. The standard protocol when a water sample is found to contain the presence of coliforms, however minute, is to resample the water immediately at the same location and resubmit for testing. The provincial Drinking Water Officer will determine if any action by the purveyor is necessary only after a second test also shows the presence of coliforms.

? **In 2007 the City submitted 150 samples for *E. coli* and coliform testing and one sample came back positive for total coliform. It was immediately resampled and determined to be a negative result, likely due to a dirty sampling tap.**

RECORDS

The City employs an automated and continuously operating system to monitor water quality, flow, pressure and storage levels. This system is called SCADA, *Supervisory Control and Data Acquisition*, and it assists City staff to maintain a safe drinking water supply by advising when dosage or residual disinfectant levels are outside of set parameters (either high or low) for the system. The SCADA system will alert staff by radio, pager or computer message to ensure that corrections can be made before water quality can be adversely affected.

Test records, as noted previously, are stored on the City's WaterTrax? database. Information from this database can be retrieved in many formats for presentation, analysis or public information. For example, the monthly water report posted on the City of Castlegar website is prepared using WaterTrax? . An annual summary of chlorine, *E. coli* and Total coliform test results, generated by WaterTrax? has been appended to this report for reference. This data is also used to provide information to the provincial Drinking Water Officer, including the completion of this annual report.

STAFF

Trained, certified City staff work to maintain the 24 hour per day supply of safe drinking water that is available to users in Castlegar. This is accomplished by ensuring that staff is on duty every day of the year and that the previously mentioned SCADA system is operating continuously. Water distribution work is also done by staff certified for their tasks: water main

replacement, water service installation, fire hydrant and valve maintenance. Special tasks such as reservoir cleaning and leak detection are undertaken by qualified contractors with the proper equipment and experience to complete the work.

INITIATIVES - 2007

City staff continued implementation of the Cross-connection Control Program started in 2004.

The raw water system monitoring regime changed slightly in 2007 to provide additional water quality planning information for the future Water Treatment Centre Upgrade. A rare algae bloom event occurred in the spring of 2007 at the raw water source, prompting the need for increased monitoring of organic compound levels at the physical end of the distribution system. Accurate determination of the biological makeup of the bloom is essential for determining the best course for implementing future treatment barriers, should the occurrence of algae blooms become a more frequent occurrence. Also, full spectrum analysis of the raw water has increased in frequency from quarterly to monthly to ensure accurate tracking of changing trends in the source water quality.

Design work for offsite servicing of a planned 118 single family unit residential development began in 2007. Phase one construction of the offsite water system infrastructure is expected to take place in 2008.

Water conservation and demand side management planning began in earnest in 2007. A Voluntary Residential Water Meter Program was recommended by staff in 2007 but was ultimately voted down by Mayor and Council in favour of a more aggressive mandatory plan set to begin in 2008. Also, Mayor and Council endorsed the recommendation from staff to start work on a comprehensive Total Water Management Plan.

FUTURE WATER QUALITY

A water treatment study completed in 2005 recommended the installation of an ultra-violet treatment system at the existing Treatment Centre, to augment the present chlorine disinfection system, in order to provide a dual-barrier treatment system. In December 2006, an application was made to the Canada British Columbia Municipal Rural Infrastructure Grant Program for funding to be directed towards the estimated \$3,300,000 capital improvement.

The City was unsuccessful in its application for funding. The grant authority cited a lack of formalised demand side management strategies as a primary factor in the decision not to award Castlegar the grant.

It is anticipated that a comprehensive Water Management Plan coupled with Universal Residential Metering will provide the necessary framework for proactive demand side management. Once the Water Master Plan is completed and the Universal Residential Meter Program is underway, Castlegar should be in a better position to be successful in receiving grant funding for a dual-barrier treatment system.

CONCLUSION

This 2007 City of Castlegar Water System Report is posted on the City of Castlegar website for public viewing; it may be accessed at www.castlegar.ca.

The British Columbia Drinking Water Protection Act and Regulations, requires that the report be made public and further that the terms and conditions of the City's Water System Operating Permit (0210617) issued by the Interior Health Drinking Water Officer be strictly adhered to.

Respectfully Submitted,

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