## **CITY OF KELOWNA**

### MEMORANDUM

Date:July 4, 2002File No.:0360-20

To: City Manager

From: Water Manager

Subject: Completion of Water Quality Task Force Recommendations

### **RECOMMENDATION:**

**THAT** Council receives the following report that outlines the completion of all Water Quality Task Force recommendations,

**AND THAT** Council direct staff to proceed with the implementation of a full-scale water treatment using UV (ultraviolet light) technology,

**AND FURTHER THAT** Council direct staff to prepare an application for funding to the Canada /BC Infrastructure Program for UV treatment and that this application go forward as the first priority for the City of Kelowna.

## BACKGROUND:

In response to a cryptosporidium outbreak in August of 1996 a number of immediate steps were taken by the water utility to minimize the risk of reoccurrence. At that time a detailed review of treatment options was also completed with two best options put forward including filtration and ozonation. Due to the generally high quality of Okanagan Lake it was determined that the filtration option was not a cost-effective option at a cost of \$50 million dollars. Ozone treatment was therefore determined to be the best alternative to meet treatment requirements at a cost of \$24 million dollars. A number of planned improvements to infrastructure piping were also identified at a cost of \$20 million dollars and these would need to be accelerated to ensure proper levels of disinfection were met using ozone treatment. At that time it was apparent there were divided views within the community and local health authorities regarding the need for an expenditure of this magnitude relative to the overall impact to the community. A general consensus did however exist that risk reduction initiatives were necessary to reduce future risk of reoccurrence and that further research on alternatives was required.

As a result the Mayor's Water Quality Task Force was established which included sixteen (16) representatives from various sectors within the community. The mandate of the Task Force was to review and analyze all initial information related to the outbreak, explore and recommend all approaches to risk reduction including treatment, analyze all research information presented, review the costs for implementation and make final recommendations. The Task Force and staff met 20 times over an 18 month period, conducted a number of field trips and workshops, initiated 12 separate studies and research projects and met with a variety of water experts in various fields of expertise.

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Thirteen (13) recommendations were developed as part of the Water Quality Task Force Report presented to Council in June of 1999. Staff subsequently developed a strategy to address each recommendation that was approved by Council using a "source to tap" approach with a primary focus on reducing risk associated with cryptosporidium and giardia. Alternate supply options were explored, response plans were developed in conjunction with other purveyors, operating, maintenance and water quality monitoring programs enhanced, continuous improvement programs developed for the utility and the latest in water treatment technologies explored. Ultraviolet light technology (UV) was pilot tested on Okanagan Lake source water as part of a joint research study to determine its effectiveness in inactivating cryptosporidium and giardia.

Since Council's approval of the recommendations regular progress reports were provided by City staff to the Task Force. Each of the 13 recommendations has been addressed and is outlined in the attached Schedule A.

## Financial Considerations

To date \$335,000 has been expended to implement all recommendations to reduce risk while treatment barrier alternatives were being explored. This work was approved by Council and funded from the Water Quality Enhancement Reserve. Engineering estimates for full-scale UV treatment have now been developed and are outlined in Schedule B. The estimates include all costs to retrofit existing pump stations at Poplar Point, Eldorado and Swick Road as well as a provision for full scale UV treatment at the proposed Cedar Creek Pump Station. The total cost to install UV for all existing locations is estimated at \$6.2 million dollars which includes a provision for the proposed Cedar Creek pump station. An application to the Canada/BC Infrastructure program for 2/3 funding will be prepared subject to Council approval. It is also anticipated that funds contained in the Water Quality Enhancement Reserve will be in the order of \$1 million when the project is ready to proceed. Therefore infrastructure grant funding along with reserves could contribute up to \$5.1 million dollars toward the entire cost of the project. The balance of the project would be funded through long-term debenture borrowing.

#### Proposed Schedule

Previous grant application experience has shown that grant announcements are traditionally made a year following the initial application. In this scenario, if approved, detailed design would then begin in mid to late 2003 with construction occurring in early 2004.

Don Degen Water Manager John Vos Director Works and Utilities

## SCHEDULE A

## WATER QUALITY TASK FORCE RECOMMENDATIONS

### Recommendation #1

# Proactively review and participate in new technologies to monitor and control giardia and cryptosporidium.

### <u>Action</u>

- 1. All intakes are equipped with online monitoring to detect any physical change in source water quality. This equipment is linked to 24 hour computerized data acquisition and alarming systems. Automatic sampling occurs at any time if source water quality changes and response plans are in place that reflects any variations in water quality. This sampling program is in addition to the rigorous sampling and analysis performed throughout the water distribution system on a regular basis by staff. Samples are then sent out and tested for cryptosporidium, giardia as well as other parameters.
- 2. New technologies for treatment have been explored. Pilot project results now confirm that UV (ultraviolet) light technology will successfully inactivate cryptosporidium and giardia.

### Recommendation #2

Prepare a long-term implementation and financial strategy to allow for the eventual construction of a water treatment technology which will provide adequate treatment for giardia and cryptosporidium.

## <u>Action</u>

Research has determined that UV light technology is well suited as a treatment technology and will successfully inactivate cryprosporidium and giardia. Cost estimates to implement this technology have now been prepared as part of a long-term financing strategy for the utility. It is now estimated that all existing facilities as well as the proposed new Cedar Creek pump station can be equipped with UV and all necessary equipment for \$6.2 million dollars.

#### Recommendation #3

Continue further analysis of potential risk reduction improvements such as deeper intakes, ground water usage and limnology surveys to obtain a better understanding of Okanagan Lake dynamics.

#### <u>Action</u>

Lake limnology research has proven that surface water influences can occur at the intakes under certain conditions on Okanagan Lake. Water quality monitoring data also suggests a slight improvement in source water quality at deeper depths. Extending the intakes to deeper depths in the absence of a treatment barrier results in a reduced risk however, at significant cost. In addition research conducted on groundwater as a source of supply has shown limited supply is available and significant treatment is required. The recommended option that results in the highest reduction of risk at the least possible cost is to maintain the existing intake depth and install a UV treatment barrier on the utility's source of supply.

## Recommendation #4

Explore the availability of grant monies for water quality improvements.

## <u>Action</u>

The Water Utility is now preparing a grant application for funding assistance through the Federal/BC Infrastructure Fund for 2/3 funding assistance. This application will be submitted in mid 2002.

## Recommendation #5

## Implement a public mechanism to monitor the progress of any implementation strategy.

## <u>Action</u>

Staff has continued to work through the Water Quality Task Force as a public mechanism and have solicited feedback on all research and implementation phases of each recommendation. The Task Force will continue to be involved as work is finalized on the financial and implementation strategy for treatment. Staff will be providing additional updates to water utility customers on progress and will be conducting to gain feedback on approaches and costs associated with UV treatment

#### **Recommendation #6**

Continue and increase the financial support of watershed improvement programs recognizing the contribution of the watershed to the quality of drinking water.

### <u>Action</u>

Over the past 3 years the Water Utility has worked with the Environment Division, the Kelowna Joint Water Committee and the Province to provide water quality monitoring and public education programs within the watershed. These initiatives will continue, to more clearly understand recreational and wildlife impacts on source water.

#### Recommendation #7

Ensure controls are in place within the utility to minimize the risk of City water being contaminated through human error or faulty procedures and processes. This should include the implementation of a formal utility review process.

## <u>Action</u>

- 1. All operating and maintenance procedures have been reviewed internally and with all water purveyors within Kelowna to ensure similar standards wherever possible.
- 2. The Kelowna water utility completed a comprehensive review of all its financial, business and operating units through the AWWA Qualserve program. A number of strengths were identified along with opportunities for improvement. Recommendations from the Qualserve continuous improvement process continue to be implemented.

#### Recommendation #8

Give consideration to increasing the Water Quality Enhancement Fee in anticipation for the long-term treatment capital expenditures for treatment that will be required.

## **Action**

The utility is currently completing a comprehensive water rate review and developing a longterm financial strategy. These reviews will make recommendations on how best to fund the future long-term financial needs of the utility.

## Recommendation #9

# Give consideration to some form of giardia treatment for the outfall from the City's wastewater treatment plant.

## <u>Action</u>

Preliminary research has been completed to determine the effectiveness of the existing UV disinfection system used on the wastewater treatment plant effluent. This system was originally installed in 1995 to replace the existing chlorination system to meet bacteriological requirements for the effluent. Initial research conducted recently has shown that the UV system in place is effectively inactivating any giardia that may be part of the plant effluent. The wastewater treatment plant effluent continues to be of very high quality and research conducted by the City of Kelowna in cooperation with The University of Alberta and NSERC (National Science and Energy Research Council) is expected to continue in 2002.

### Recommendation #10

Work with the Kelowna Joint Water Committee and the local Health authorities to update the Water Quality Deviation Response Guide to incorporate a response based on cryptosporidium levels.

## **Action**

The local medical health officer in conjunction with the Kelowna Joint Water Committee has developed a water purveyor protocol that establishes specific testing requirements for each water purveyor based on water quality data. The latest revision of the Water Quality Deviation Response Plan now reflects this protocol.

## Recommendation #11

## Water Quality Issues must be considered in a basin wide context.

#### <u>Action</u>

The City should strongly request an update by the provincial and federal government and the Okanagan Basin Water Board of the recommendations made in the Okanagan Basin Report of 1974.

#### Recommendation #12

Ensure the Water Quality Task Force Report and its recommendations are reviewed by the Kelowna Joint Water Committee with the view of taking necessary steps to ensure that all five City of Kelowna water purveyors have a consistent application of all reporting procedures and policies and the Canadian Drinking Water Guidelines.

#### <u>Action</u>

The Kelowna Joint Water Committee has been represented on the Water Quality Task Force since its inception. The Kelowna Joint Water Committee continues to work closely with local health authorities to review all necessary reporting requirements as well as operating, material and system maintenance standards to ensure a consistent approach by all purveyors.

#### Recommendation #13

# That the City continues its efforts to reduce water consumption through its Water Smart Program.

### **Action**

The Water Smart education program continues to be firmly entrenched within the Kelowna water utility and has resulted in an annual reduction of approximately 18% in average annual water consumption for the utility. A more focused approach to address peak water demand, which occurs during irrigation season, is now underway. Preliminary engineering analysis suggests that if peak demand reduction targets can be achieved significant capital cost reductions can be realized over the 20-year horizon for the water utility.

## SCHEDULE B

## **UV TREATMENT FINANCING & CONSTRUCTION SCHEDULE**

#### (PROPOSED)

<u>Location</u>	<u>Utility</u> <u>Cost</u>	<u>Grant*</u> <u>Funding</u>	<u>Total Cost</u>	<u>Design</u>	<u>Construction</u>
Poplar Point	\$1,100,000	\$2,100,000	\$3,200,000	2003	2004
Eldorado	\$500,000	\$1,000,000	\$1,500,000	2003	2004
Swick Road	\$170,000	\$330,000	\$500,000	2003	2004
Cedar Creek	\$330,000	\$670,000	\$1,000,000	2003	2005
Total Cost	\$2,100,000	\$4,100,000	\$6,200,000		
Municipal Funding WQ Reserve	(\$1,000,000)				
Dependure Borrowing	(\$1,100,000)				

\*Grant Funding shown is on the basis of receiving 2/3 Funding assistance through the Canada/BC Infrastructure Program