Solutions a must for water woes

By Dr. Hans Peterson

Earlier this year, CBC radio broadcast a national documentary called "Slow Boil" that investigated water quality issues in Aboriginal communities. That same morning, I fielded 10 live interviews from different regions through the CBC broadcast centre in Saskatoon.

Later that day, the Indian and Northern Affairs (INAC) Minister Jim Prentice pledged he would deal with unsafe drinking water on reserves across the country.

That hasn't happened yet, but a federal inquiry has been touring the country getting feedback from Aboriginal communities on water issues. Some of the questions: "Should we have drinking water guidelines or regulations? Should those regulations/guidelines be enforced by the province in which the community is located or by the federal government?"

This is just smoke and mirrors. The concept of guidelines/regulations for drinking water quality was formulated with big cities in mind. Cities with good water sources, lots of money to do all kinds of fancy testing and treatment processes to address changes in the incoming source water quality. Nobody thought about the small rural communities that suffer from compromised raw water sources, coupled with limited financial, human and technical resources.

In the U.S., with its much more stringent regulations, the National Research Council cautioned in 1998: "Current drinking water quality standards are aimed at water obtained from relatively uncontaminated sources and, thus, cannot be relied on as the sole standard of safety."

Indeed, the U.S. Environmental Protection Agency realized the foolhardiness of trying to test its way to safe drinking water and is imposing treatment requirements as well as testing regulations. This means that when INAC approves chlorination only for a water supply, this "treated" water may meet some guidelines, but would fail the requirement for providing effective treatment of the water.

Even really poorly treated water can meet some guidelines,

Close-up of blue-greens in the water

Yellow Quill Nation's Roberta Neapetung climbs into a reservoir to clean it.

some of the time. Yellow Quill's Roberta Neapetung put it clearly to the inquiry. When the treated water reservoirs at Yellow Quill were cleaned, a one foot deep layer of black ooze covered the bottom. When the reservoirs were full, the quality of the distributed water could be quite reasonable, but when they were low various amounts of ooze would enter the distribution system and people's homes. Continuous turbidity monitoring used by cities could catch such problems, but Health Canada's routine testing would not.

It is essential that Health Canada/INAC have people who understand the real challenges when treating poor water quality. We don't need desk-bound people, we need people to get into the drinking water reservoirs with rubber boots. At that point one's sense of smell gets overwhelmed. And it isn't exactly coming up roses.

The answer to Aboriginal water quality challenges cannot be simpler. Instead of using inferior treatment processes to treat poor quality water, we need superior processes that can actually deal with the problems, not once in a while, but always. A few years ago those processes did not exist. However, at Yellow Quill we were able to develop advanced biological water treatment followed by reverse osmosis membranes (RO), which we call Integrated Biological and RO Membrane Treatment (IBROMT).

Immediately after the cleanup of the reservoirs at Yellow Quill in December 2003, we tossed a quarter into each of the three treated water reservoirs. Since that time these reservoirs have been filled with water from the new treatment process. When full, the quarters can still be seen at the bottom of the 3.6-metre deep reservoirs today just as in December 2003.

The developments at Yellow Quill have come to point to the possibilities of cheaper, yet at the same time more effective water treatment processes. The need for yearly reservoir and distribution system cleanings have gone. Chemical use has dropped like a rock and even the amount of chlorine required has decreased by 90 per cent.

The IBROMT Process has now been implemented by both the Pasqua and George Gordon First Nations. Gordon's previously used manganese greensand ahead of RO membranes, but continuous

problems with the RO membranes resulted in membrane replacements every eight months ($38,000 in membrane costs alone) and frequent chemical cleanings. Gordon's Bob Pratt showed the inquiry pictures of membranes fouled by the manganese greensand pretreatment.

Compare that with Yellow Quill, where the RO membranes did not even need to be cleaned until after 18 months of use; RO membrane life expectancy at Yellow Quill is greater than 10 years.

But, George Gordon has now also switched to the IBROMT process and in addition to decreased need for membrane cleanings, the amount of backwashing water required for the biological vs. the manganese greensand filters has dropped by 95 per cent. Savings in chemical, membrane and water use at George Gordon has been estimated at $100,000 per year following the switch to better treatment methods.

Saddle Lake has struggled for years to deal with excessive quantities of bluegreen algae and otherwise really poor quality water. Dr. David Schindler, Safe Drinking Water Foundation (SWDF) chairman and the recipient of many environmental awards, put it like this after visiting Saddle Lake in July 2006:

"I have just come back from Saddle Lake. I've never seen a water supply in such a poor

Pieces of RO membrane that were fouled by manganese greens and treatment.

shape. The lake is covered with bluegreens, Aphanizomenon and Microcystis, classic toxin producing species. The stench is amazing when they rot. Yet this is a drinking water supply for 7,000 First Nations people!"

Several experts on drinking water have been to the lake, and given up. There have been two treatment plants installed, neither able to cure the problem. This is a story that city people need to hear and see. They cannot imagine that we have water problems of this magnitude in Alberta.

Tony Steinhauer is in charge of water treatment at Saddle Lake and has been searching for solutions to his community's water problems for more than 20 years. After hearing about Yellow Quill, Saddle Lake's chief and council travelled with Tony to Yellow Quill to see what this new treatment was all about. Using biology instead of chemistry to treat water – It seemed too good to be true. Indeed, Yellow Quill's Chief Robert Whitehead after the plant was operational put it like this: "Hans, it is like magic!"

We are still working with Saddle Lake to develop a similar, but yet quite different, biological and RO system for poor quality surface water. We are now sure that we can do it with virtually no chemicals. Considering that Saddle Lake has paid up to $15,000 per month in chemicals (and yet failed to produce safe drinking water), the new treatment will not only be much more effective, it will also be much cheaper. The environmental impact will also be much less.

The basis for the biological treatment at Saddle Lake rests with removal of huge amounts of bluegreens in the raw water as well as any compounds that bacteria can use to gain energy or use as a nutrient. Following this treatment it is possible to split the water in two using RO membranes, this leaves all the chemicals and microbes on the waste side with only pure water on the product side. And, please remember that currently Saddle Lake residents drink a mixture of these two!

This brings us to the real solutions for water in Aboriginal communities. Use science to find more effective solutions and a dream of mine may come true. This is to being able to produce advanced water treatment systems at costs that are no higher than current conventional, ineffective systems.

Our efforts in this regard have already been recognized by other groups and Yellow Quill and SDWF were invited to present these developments to the United Nations in 2005. We need to continue this positive search for better water treatment processes and to help us along we are holding a "Drinking Water Solutions" conference in Edmonton, April 25-28, 2007.

SDWF used to battle the federal government (and some provincial government agencies) on a daily basis. The problem we had was constant government abuse of science leading to expensive, yet ineffective, water treatment methods. Some government agencies continue with these misdirected policies, but we are encouraged that others are beginning to make better choices. INAC's Saskatchewan office has led the way dragging the Edmonton office with it.

These positive efforts have been spearheaded by INAC's Jouko Kurkiniemi and Earl Kreutzer, two people that truly deserve feathers in their hats!

(Hans Peterson is executive director of the Safe Drinking Water Foundation. For more information, go to www.safewater.org)