Moving Towards Defining what Water Treatment Process would work at Yellow Quill

By Dr. Hans Peterson

This is the third of several articles on First Nations drinking water to be written by Dr. Peterson.

Selecting a water source to treat

In last month’s article you will recall that I wrote that Yellow Quill’s raw water source during its worst years for water quality was pumped water from Pipestone Creek into its raw water reservoir. To make matters worse, Kelvington annually released its wastewater lagoon into Pipestone Creek. Most wastewater discharges from lagoons in Saskatchewan are of really poor quality in the spring. This is an inherent 30-year lagoon design flaw that has not been corrected. All of these spring discharges need to be diluted with runoff water from the snow-melt, which is a very short-lived event.

So what faced the Project Management Team (PMT) was the following dilemma: 1) Select existing water supply and pump up sewage-tainted water from Pipestone Creek into the raw water reservoir for the water treatment plant, or 2) Select a groundwater source that Indian Affairs had deemed “untreatable.”

Could this be defined as being between a rock and a hard place? Well, there were other choices, and one was to pipe water from somewhere else. One source was found 90 km away. In 2002 dollars that would have meant a $7 million pipeline plus still the expense of building a water treatment plant. So, choices 1 and 2 were really what the contest was all about. In any water treatment scenario it is extremely undesirable to treat water that has been tainted by sewage so Choice 2 was deemed to be the only viable choice available to Yellow Quill.

Treating an “untreatable” water supply?

The water source that was selected had been labelled as “untreatable” by Indian Affairs. What to do?

My suggestion at the time was to have the engineering company do an extensive pilot study testing many different existing technologies and hopefully find that one of those technologies, if optimized to treat the Yellow Quill groundwater, could actually do it.

Then, one day, I was called into the engineering company’s office and told that none of the company’s water engineers wanted to move out to Yellow Quill and do the piloting. I was told that if I didn’t do it myself the project would be abandoned. At that time I was working on a large project that was supported by the National Research Council and I was reluctant to accept this suggestion. But, having the project abandoned and leaving the Yellow Quill community without a solution for its poor water quality was something I felt was much less desirable than abandoning my existing project. I had volunteered for three years for Yellow Quill and thinking about Yellow Quill’s community members that had become my friends and then thinking about people I would consider heroes at Yellow Quill made me decide to accept the challenge.

Obstacles to bringing water that meets guidelines into First Nations communities

At the time I accepted the challenge to carry out Yellow Quill’s pilot on “untreatable water” I did not fully realize the extent of the sacrifices many people had made and were still making to bring better water to their communities. Now, some 13 years later I am aware of the many challenges facing First Nations trying to bring safe drinking water to their communities. It requires tremendous courage by leadership especially when leadership wants to make sure that the water treatment process can meet the full complement of the Guidelines for Canadian Drinking Water Quality into the community. Why is this?

Water treatment plant designs

In Saskatchewan, engineering companies are not required – even though they ought to be – to design water treatment processes that can meet the Guidelines for Canadian Drinking Water Quality and I assume some engineering companies feel that sub-par treatment systems will be cheaper. The federal government also remains a staunch supporter of the lowest bid process, discounting operational ease and quality of the treated water.

Another strike against getting proper water treatment processes in First Nations communities stems from the fact that with the many staff reductions at INAC, one may wonder if this department has enough technical abilities remaining to judge water treatment proposals on technical merit. I have personally tried to convince engineering companies to commit to providing drinking water that meets the Guidelines for Canadian Drinking Water Quality to First Nations communities. Some have committed to this as long as five years ago. Others apparently don’t feel the need to protect the First Nation by, at the very least, meeting the Guidelines for Canadian Drinking Water Quality.

In all, it is not that difficult to meet Canadian Guidelines because they are “politically correct.” By that I mean that even if Health Canada wants to make some of the health parameters in the guidelines more stringent, each province has input and most of the time a few provinces will oppose Health Canada’s wishes. This is how we still have some parameters that will exceed what Health Canada has proposed to the provinces. In other words, some provinces allow limits to exceed what Health Canada deems safe! This is how technical recommendations give way to political expediency, hence “politically correct.” Where do the politicians who will not accept this hide?

To make things perfectly clear, here is an example: Health Canada suggests to the Provinces that the guideline for arsenic, according to the science, should be 5 micrograms/L (or lower) and that it be set at 5. Some provinces, including Saskatchewan, protest. So, it is set at 10 micrograms/L. Saskatchewan still was not happy and kept the arsenic guideline for years at 25 micrograms/L, which was the previous Canadian Guideline.

Health Canada drinking water quality monitoring

Routine monitoring of First Nations drinking water is only made on two out of 77 health parameters in the Guidelines for Canadian Drinking Water Quality. Not even Health Canada epidemiologists feel that this is enough to determine if the water is safe to drink. How can Health Canada feel it is satisfactory or acceptable to accept 95% of its health parameters in the Guidelines for Canadian Drinking Water Quality in its routine testing in First Nations communities?

Now I realize there is no federal legislation to provide that First Nations drinking water needs to comply with anything. I guess it is possible that Health Canada’s technical resources, like INAC’s, are also pushed to the limit. The concern I am raising about the federal government is: Is helping First Nations to produce safe drinking water no longer a priority? Are First Nations communities simply at the mercy of engineering companies that may or may not have the best interest of the community at hand?

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The health costs of poor quality drinking water

The cost of poor quality water, however, can be steep. It will be manifested in community health issues. Many of those issues will claim a toll in communities. Ignorance is not bliss and while Canada has no waterborne diseases caused by viruses it is worth noting that in the USA two-thirds of all waterborne disease outbreaks are caused by viruses. Indeed, when conventional treatment is used ample food for bacteria enters the treated water and distribution system in the community. This food can provide for disease-causing microbes including bacteria, such as Mycobacteria. Mycobacteria grow along the walls of distribution pipes and if there is a pressure or flow "bump" they can be dislodged and community members may get pneumonia just from taking a shower. Who would ever expect that? This one example is only the proverbial "tip-of-the-iceberg." Community health issues such as these have not been addressed in Canada. I have made suggestions to Health Canada about their importance when chemical water treatment processes are employed.

Poor quality water can also greatly shorten the lifespan of water heaters and other water-requiring appliances as well as forming unsightly deposits in bath tubs and sinks. These costs are borne by community members. Why not estimate such costs when a new water treatment plant is built? Technologies that resolve these issues should be favoured or at least the cost savings should be included in compara-
tive estimates.

Yellow Quill leads the way to safe drinking water

The Yellow Quill PMT took the unprecedented step to demand that the new water treatment plant had to meet the full complement of the Canadian Guidelines both now and into the future! Into the future was 20 years from that moment. Note that this has no waterborne diseases caused by viruses it is worth noting that in the USA two-thirds of all waterborne disease outbreaks are caused by viruses. Indeed, when conventional treatment is used ample food for bacteria enters the treated water and distribution system in the community. This food can provide for disease-causing microbes including bacteria, such as Mycobacteria. Mycobacteria grow along the walls of distribution pipes and if there is a pressure or flow "bump" they can be dislodged and community members may get pneumonia just from taking a shower. Who would ever expect that? This one example is only the proverbial "tip-of-the-iceberg." Community health issues such as these have not been addressed in Canada. I have made suggestions to Health Canada about their importance when chemical water treatment processes are employed.

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tive estimates.

The senior engineer for the engineering company, Dan Hogan, was also a key supporter in all of this. Dan had swept the six water treatment processes off the table that his own engineering company had suggested. Dan did not believe that any of them would meet the Guidelines for Canadian Drinking Water Quality. With people like these supporting and holding out such great hope for a solution how could I not do my best to be part of this solution and do the job?

In the August issue of the Tribune Dr. Hans continues his story about how Yellow Quill got truly safe drinking water that also tastes great.