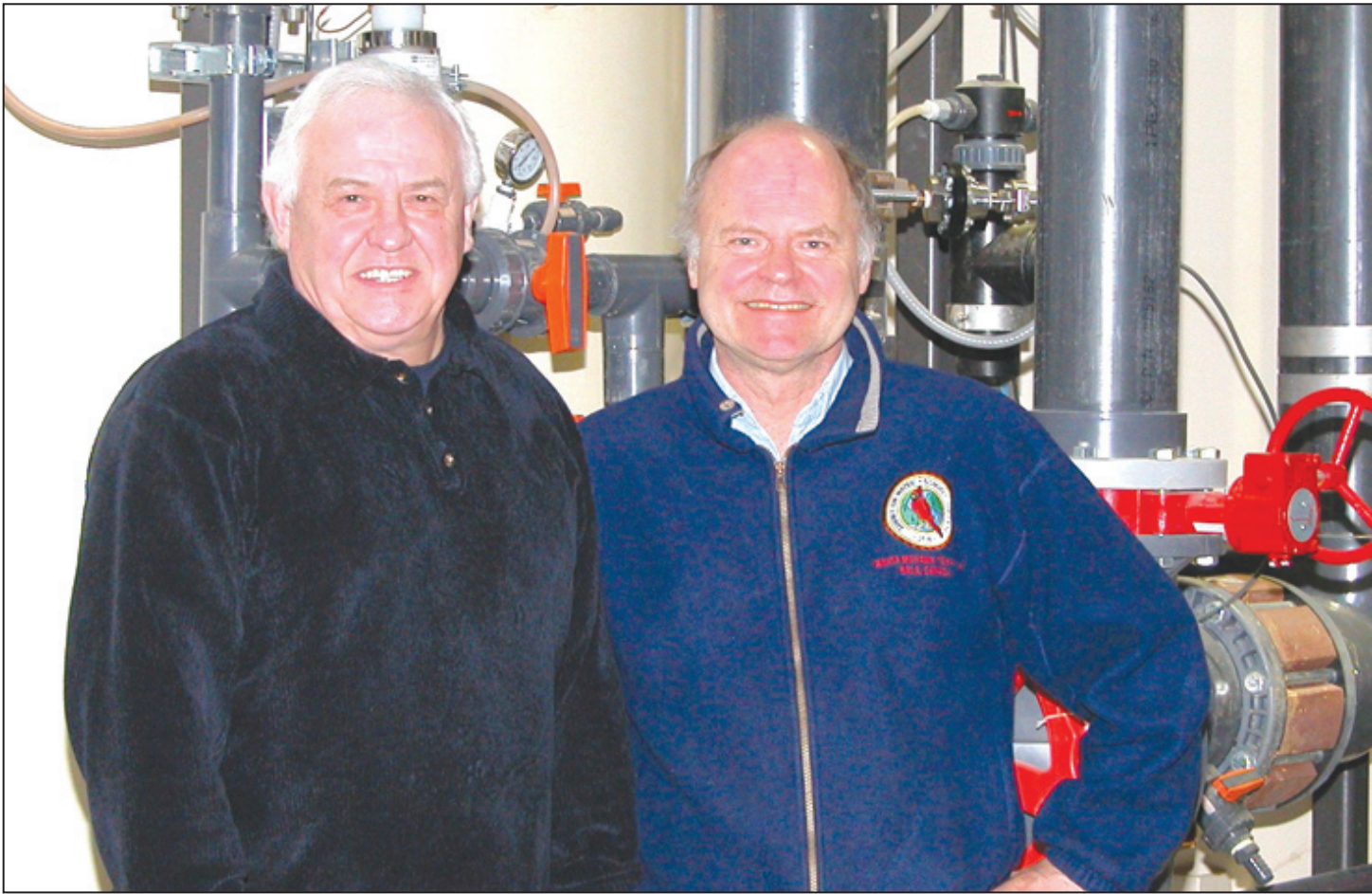


Moving Towards Defining what Water Treatment Process would work at Yellow Quill



Dan Hogan and Dr. Hans Peterson.

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Bob Pratt

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Brian Tralberg

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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 labeled as "untreatable" by Indian Affairs. What to do?

My suggestion at the time was to have the engineering company do an extensive piloting 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 quality water 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 when 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 signed on 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.

After 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 well 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 expedience, 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 use only 3% 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 comparative 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 time as this is the average life-span of a water treatment plant. This begs a question: Okay, an engineering company

decides to design according to the Guidelines and will use technologies that can meet the Guidelines today.

We already know that several of these guidelines are more political than technical so would one not at the very least take some of those into account? It is hard to imagine that there would not be somebody at the engineering companies who knows exactly what these "politically correct" guidelines are. Yet, as I write this plants that can just scrape by the current guidelines are constructed. I will mention what those "scraping by" technologies are in future articles. Another feature of the "scraping by" is that they will have no measurable positive effect on human health. If Health Canada's recommendations would have been adopted by the provinces "scraping by" would be much decreased.

Engineering challenges at Yellow Quill

It took courage by the senior engineer on the Yellow Quill project to discard all of his company's water treatment plant suggestions. An earlier engineering company working for Yellow Quill had also suggested a series of water treatment processes, but added a caveat *that they would not guarantee that any of them would work*. I had experience with one of those water treatment processes, the use of Granular Activated Carbon (GAC) to remove organic material from the water. Looking at the chemistry of Yellow Quill's raw water I knew that this particular treatment process would work for less than one month. But, where could Yellow Quill turn for advice on these types of issues?

Councillors fighting for better quality drinking water at Yellow Quill

I wonder if Yellow Quill community members realize the huge leap many people took that got the Yellow Quill project moving from "let's build a water treatment plant which we don't know will work" to "let's try to understand what would work at Yellow Quill." The ones that took that leap were band councillors Verna Cachene, Leonard Pasanipiness and Gilbert Kewistep. They insisted that Yellow Quill simply

would not tolerate being on what looked like a permanent boil water advisory. In 1999 the boil water advisory had already lasted for four years. It would be another 5 years before Yellow Quill's boil water advisory could be lifted.

Certainly there were no "quick-response" teams like what happened both at the waterborne disease outbreaks at Walkerton and North Battleford which became national news. Indeed, there was little action. The late Robert Neapetung, who was the water treatment plant operator, several Elders and community members from Yellow Quill got the councillors to take action. Community members have to become involved or they may have to suffer another 20 years with some scraping by technology that may even be a downgrade rather than an upgrade.

Tribal councils need to keep current with what technologies work on the types of water First Nations communities in Saskatchewan have to deal with. This is not where most technologies have been developed. Well, except the Integrated Biological and Reverse Osmosis (IBROM) treatment process. Typically, water treatment processes have been developed on much better quality water than we have to deal with. This fact used to be routinely ignored by engineering companies as witnessed by the proliferation of sub-par water treatment processes implemented. Now, First Nations leadership will still accept this unless they educate themselves on how best to treat their water sources so that they become truly safe to drink.

Let your water treatment plant operators and public works managers become more knowledgeable in water treatment. Let them visit other water treatment plants and talk to operators. Is the plant easy to run? What does the treated water quality look like? Health Canada makes excellent assessments from time to time, and this data is shared with the community. What does it look like? What are the costs to operate the plant?

These costs can affect the community. Then let their voices be heard at the PMT table. The PMT table is where the First Nation can exert its influence. The community PMT members are the only

of the people on the PMT that will be stuck with the water treatment for the next 20 years. Make your voice heard. Is waiting to speak until after the fact when community members start to complain wise?

Band PMT members are sometimes coerced into making decisions they don't want to make. Don't let it happen. Now, it is possible that the engineering company will not complain about being called in 5 years into a new water treatment process just to try to fix it. Is this acceptable? I don't think so.

Water treatment heroes show up at Yellow Quill

Then in 1999, as I wrote in the last article, a rookie environmental health officer from the Saskatoon Tribal Council, Carla Plotnikoff, showed up, and demanded answers. Carla feared for the health of Yellow Quill's community members. Without Carla's actions I would never have gone to Yellow Quill. Maybe I would have never worked with First Nations communities anywhere as I had lots of work doing other things.

But, one more piece of the puzzle was required. At Yellow Quill we had a PMT engineer from Indian Affairs who seemed to be in perpetual stalling mode; nothing got accomplished on the water file for two years. Two more years of boil water advisories. To me, an outsider, I wondered how was this possible?

Then one day INAC sent a new engineer to Yellow Quill. His name was Jouko Kurkiniemi. More was accomplished in the first PMT meeting with Jouko representing the federal government than in the two years prior.

We could literally call the two years prior to Jouko arriving "the stalling years." In contrast, every PMT meeting chaired by Jouko was full of action and a real sense of urgency to help Yellow Quill. Behind Jouko was another Indian Affairs hero, Earl Kreutzer. After I decided to do the pilot Jouko made it clear to me that this was not about trying to find the cheapest method to treat Yellow Quill's water but about the best way of doing it. Now this was heartening. Jouko demanded that Indian Affairs find the technical solution to Yellow Quill's problem of dealing with an "untreatable raw water source." Jouko also demanded that we were to think of the operator and make his/her life more tolerable. The process we set out to find may have been a pie in the sky, but with never wavering support from Jouko and Earl the long days and nights trying to find a solution became exciting. We were to push the frontiers of water treatment forward!

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 pilot?

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.