

Development of Community Framework for Safe Drinking Water



The Need

1. Canada is the only developed country which does not have national drinking water regulations.
2. Canada's drinking water guidelines are more lax than World Health Organization (WHO) water quality standards.
3. Health Canada has a responsibility to ensure safe drinking water is accessible to all Canadians. Yet they only test for a select few parameters of the Canadian water quality guidelines, giving Canadians the perception that they have access to safe drinking water.
4. Indian and Northern Affairs Canada (INAC) is ultimately responsible for water quality on reserves for all of Canada's First Nations people, yet it does not have access to treated water quality analyses undertaken by Health Canada, nor does INAC analyze source waters. Therefore INAC is not capable of determining if any FN water treatment plants, or water treatment processes, are actually capable of producing safe drinking water.
5. Many rural communities have source waters as challenging as their First Nation neighbours. However, rural communities are under provincial jurisdiction for water quality, which in some Canadian provinces are more lax than the national Canadian guidelines.
6. Often rural community leaders are able to provide upgrades, or build new water treatment plants, with federal and provincial funding partnerships such as Western Diversification. Unfortunately, programs such as Western Diversification do not ensure that the projects they fund are capable of producing safe drinking water or even capable of meeting Canadian or provincial drinking water guidelines, thereby giving rural communities a false security that they are in fact providing their citizens with safe drinking water.
7. Both rural and First Nation communities are at severe risk of health issues resulting from unsafe drinking water because (in the estimation of SDWF scientists) more than 90% of water treatment plants in these communities are incapable of producing safe drinking water.
8. SDWF has the scientific expertise to offer rural and First Nation leaders the resources necessary to determine and select appropriate water treatment systems capable of producing drinking water which is superior to Canada's drinking water guidelines and even meets or exceeds WHO standards.
9. Engineers' code of ethics includes "protection of public health", while all engineers claim adherence to this code, SDWF has not witnessed any affirmative action in this regard.
10. Typically, rural and FN communities start with some of the most challenging source waters in the world. Add to this the fact that they have virtually no knowledge base or any resources to effectively produce safe drinking water. Compared to cities that start with far superior source waters, have many professional engineers and scientists available, and who then take an average of 16 hours to adequately treat their water, rural and FN communities have no resources and their treatment time is often just minutes!

Objectives

1. To provide Community leaders with a Framework including recommendations and directions with a checklist to establish required analyses of both source and treated water supplies.
2. To provide options for engineers and/or community leaders to submit to SDWF the suggested water treatment process for SDWF scientists to review and determine reality/potential of meeting objectives.
3. To scientifically prove and recommend different water treatment processes that will produce safe drinking water based on source water quality.
4. By providing direction for follow-up analyses of treated water supplies, enable community leaders to demand and determine ongoing water quality and accountability from engineers, or those contracted to provide their community with safe drinking water.
5. To provide engineers with the ability to measure and determine potential success of various water treatment techniques.

Therefore, SDWF Community Framework of recommendations regarding how to effectively produce safe drinking water will include:

1. Guidelines for communities, offering parameters to be tested on both raw and treated water.
2. Checklists for communities to follow
3. Templates of statements to be included in contracts
4. Definitions of issues that must be resolved in the respective water treatment processes.
5. Definitions of health and safety issues.
6. Definitions of what needs to be achieved in treated water, for example, turbidity levels.
7. Definitions of the necessary analysis of source, treated and ongoing water quality.

Deliverables

- Communities participating in the SDWF Community Framework for Safe Drinking Water, and who implement SDWF recommendations will be able to exceed Canada's drinking water quality guidelines and meet or exceed the most stringent of international water quality standards.
- Community leaders who implement SDWF Community Framework for Safe Drinking Water recommendations may be considered as accountable as possible to their respective citizens
- Engineers who implement SDWF Community Framework for Safe Drinking Water recommendations will be able to operate in accordance with their code of ethics to protect human health.
- Information submitted on community checklists will determine the extent of the issues and needs to be met in each community. When communities decline to follow SDWF recommendations, SDWF will still have access to community data and/or analyses to hold Health Canada and/or INAC and provincial and municipal agencies accountable for the quality of the community's drinking water.

SDWF has hired a research scientist who will examine Canadian, U.S., European, WHO, and other international drinking water quality guidelines/regulations and attempt to make some sense of the future of safe drinking water quality guidelines. In addition, there are increasing concerns regarding the overall quality of the produced water leading many water producers to voluntarily introduce minerals, such as calcium and magnesium, to the treated water. Also, the outside regulatory view has been increasing concerns about the proliferation of pathogenic organisms including Mycobacterium and Legionella, which are biofilm forming bacteria proliferating in distribution systems with biologically unstable treated water. Selected water treatment processes will therefore also impact on distribution system problems that should be addressed by an assessment of suitable water treatment processes.

SDWF is proud to have Napier University Scotland as a partner in this project, Napier University is committed to the following objectives:

- Maintaining international recognition in areas of research strength
- Producing graduates informed by state-of-the-art Research & Knowledge Transfer

- Nurturing high quality near-market research
- Playing a leading role in knowledge transfer

Napier has an excellent record of migrating research into marketable technologies, and reaffirms the innovative and cutting edge research qualifying this project for the Scientist to complete a Ph.D. thesis on this work. Additional endorsement and partnering with Canadian Water Quality Association (CWQA) and Indigenous Environmental Network (IEN), adds even more credibility to widespread interest in transferring this much needed knowledge and innovative concept.

The project will be directed by Dr. Hans Peterson Executive Director of SDWF and Napier University's Professor Dr. Nick Christofi, Director of the Pollution Research Unit, Centre for Health & Environment and Leader of the Applied Microbiology and Biotechnology Research Group. The Group consists of scientists from the Microbiology and Biotechnology Section that carry out fundamental and applied research on micro-organisms associated with pollution of aquatic and terrestrial environments. SDWF standing committee on Health and Research, together with the standing committee on Industry and SDWF scientific advisors from around the world will also play a significant role in ensuring this project redefines the future of water treatment, not only in Canada but around the world.

The scientist will formulate and identify the templates, analyses and recommendations to make up the Community Framework package. They will work closely with participating communities during the four year development stage to ensure all information is presented in a simple, easy-to-follow format. Following the development period, the program is expected to be self-sustaining as communities will be required to pay a fee for service once the program is fully developed.

Collaboration and external evaluations of this project will be conducted with Canadian Water Quality Association and Indigenous Environmental Network USA.