



**APEGGA**

*The Association of  
Professional Engineers, Geologists  
and Geophysicists of Alberta*

*Position Paper on*

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***Drinking Water Quality  
in Alberta***

***Submission to  
Minister of the  
Environment***

***February 2003***

# APEGGA Position Paper on Drinking Water Quality

January 30, 2003

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*Safe drinking water supply is a basic quality of life issue. APEGGA professionals are already involved in various aspects of providing safe drinking water to Albertans. Technological, operational, and system management components need to function well in order to ensure safe drinking water. Failure in any one component can have serious health implications for the public. This position paper outlines the Alberta regulatory framework and provides general as well as specific recommendations to strengthen the delivery of safe drinking water to Albertans. The recommendations are both of a general nature and specific in terms of the recommended role for APEGGA professionals.*

Recent parasite and bacteria outbreaks in drinking water systems that occurred in Walkerton and to a lesser extent in North Battleford, Kelowna and Cranbrook, along with other places with boil-water orders, are indicators of inadequacy in the protection of public drinking water production and supply in Canada. These events have triggered formal reviews and in the inquiries have focused to some extent on the design and technical considerations, but more extensively on the regulatory framework, and the management and operation of drinking water production. The role of professional engineers and geoscientists has been recognized in their involvement through existing regulatory frameworks in the provision of safe drinking water in Canada. The Honourable Justice Robert Laing, Commissioner, in his Report of the Commission of Inquiry into matters relating to the safety of the public drinking water in the City of North Battleford, Saskatchewan, and in his consideration for standing at the inquiry, states with regard to the Association of Professional Engineers and Geoscientists of Saskatchewan:

*“... Its statutory mandate includes the fostering of practices of professional engineering and professional geoscience in a manner that safeguards the public and protects the public interest. In this respect it has an ascertainable interest, and will be able to offer a perspective on all aspects of engineering and geoscience that might arise in the course of the Inquiry, as well as on the regulatory regime presently in place with respect to the public water supply in North Battleford.”*

The review of these incidents shows that often a number of circumstances contribute to the failure in producing and supplying safe drinking water for the public. These can include: the failure to adequately protect the source of water; the failure to appropriately operate the treatment process; and the failure to properly monitor / record and report important information related to operation of the process unit and the quality of treated water. The technical aspects of water treatment, i.e., water quality standards and treatment facility design standards to mitigate the risks and to produce good quality water, are the responsibility of the provincial regulator.

Although the existing regulatory framework is different in provincial jurisdictions, what has happened in the above mentioned communities can potentially occur in an Alberta municipal drinking water treatment system, and the lessons learned from other locations should be used to check and enhance the protection of drinking water quality in Alberta.

## **The Alberta Regulatory Framework**

Alberta has a long history of effective regulation of municipal drinking water. Initially regulated under the province's *Health Act*, potable water became the responsibility of Alberta Environment under the *Clean Water Act* in 1972, and since 1993 has been regulated by Alberta Environment under the *Environmental Protection and Enhancement Act* (EPEA).

Drinking water systems are regulated under EPEA as follows:

- The *Potable Water Regulation* requires that systems be designed to comply with the latest edition of Alberta Environment's *Standards and Guidelines for the Design and Approval of Waterworks, Wastewater and Storm Drainage Systems*.
- The *Potable Water Regulation* requires that drinking water quality be maintained to meet the health-related concentration limits listed in the latest edition of the *Guidelines for Canadian Drinking Water Quality*, a publication developed and revised by a federal (Health Canada) – provincial subcommittee.
- The *Approvals and Registrations Procedure Regulation* outlines the process that owners of a drinking water system must follow to obtain construction and operating approvals from Alberta Environment. These approvals, valid for up to a 10-year period, have terms and conditions outlining water treatment plant performance standards and the monitoring and reporting requirements for drinking water analyses. This regulation also outlines the process for public input during the approvals process.

The regulations, supported by inspection, monitoring, abatement and enforcement activities provide a comprehensive program for ensuring safe and publicly acceptable water supply systems.

Alberta Environment also manages its drinking water program to include the following elements as part of a multi-barrier approach to provide safe drinking water:

- Watershed assessment and protection including background monitoring, pollution prevention, and risk assessments.
- Legislation supported by publicly acceptable and scientifically defensible standards for the design, approval, and performance of water treatment facilities. These standards are established in conjunction with key stakeholders, and are subject to a comprehensive public consultation process during the revision

processes. The Alberta standards for drinking water quality are the most stringent in Canada – all owners and operators of waterworks systems, regardless of size (with the exception of private systems), are required to comply with these standards.

- Adequate supply and treatment facilities, including the application of regulatory tools such as approvals and funding programs.
- Good system operation, including an effective operator training and certification program. Under this program, each owner of an approved waterworks system must have a certified operator in charge of the day-to-day operation.
- Comprehensive monitoring, including Quality Assurance / Quality Control, risk assessments, facility audits, water quality trend analyses, and an emergency response protocol.
- Consumer confidence, attained through communication, education, and provision of drinking water quality data. The department is currently working with stakeholders to implement an electronic database of monitoring information that is intended to enhance public confidence and compliance with water quality standards.

The Canadian Council of Ministers of the Environment document entitled, *From Source to Tap – The multi-barrier approach to safe drinking water (May 16, 2002)*, that was prepared by the Federal-Provincial-Territorial Committee on Drinking Water, provides an excellent outline of the elements of the multi-barrier approach. The Committee is developing a comprehensive technical support document to assist Canadian authorities in implementing the approach.

The Alberta Water Strategy, *Water For Life*, is a public outreach and consultation process to ensure that Alberta has safe and secure supplies of water for future uses to sustain the environment, municipalities, businesses and farms that rely on water. One of the key components of the strategy is to ensure the continued provision of secure quantities of safe drinking water for all Albertans.

## **APEGGA's Role as an Association**

APEGGA's role is to regulate the practice of engineering, geology and geophysics in Alberta with the goal of protecting the safety and welfare of the public and the environment. In fulfilling that responsibility, APEGGA enforces legislation that requires anyone practicing the professions to be registered with the Association. Only individuals who are qualified by training and experience are licensed to practice. Furthermore, APEGGA establishes standards for professional practice, conducts practice reviews of individual professionals and permit holding organizations, and disciplines members for unskilled practice or unprofessional conduct. This professional accountability, coupled with demand-side legislation that mandates the involvement of registered professionals,

can provide a means for ensuring that appropriate practices concerning design and operation of drinking water systems are employed.

## **The Role of APEGGA Professionals**

APEGGA professionals are leaders of the engineering, geology and geophysics professions involved in the application of science and technology for the benefit of society in Alberta. They work to develop projects and public infrastructure, to keep existing facilities operating effectively and to improve those that need it. Responsible environmental management is an inherent part of performing those duties. Specific to the activities related to the production of safe drinking water, APEGGA professionals are involved in the design (not accepted unless approved by a licensed APEGGA professional) and process activities, operations and monitoring of these facilities.

The design and process activities include but are not limited to modifications, structural concerns, process optimization, conducting feasibility studies on the systems, reviewing/installing new technologies, system expansions, following and applying evolving research and development, providing engineering approvals for engineered aspects of the facilities, overall project management on any or all part of design, construction and modification of systems, water distribution systems, risk assessment of all aspects of the facility and managing the audit process of the facility.

Operations represent the ongoing day-to-day activities that are carried out to produce safe drinking water at the facility. These activities may include the supervision of operations and staff and project management of capital expenditures, acting as a consultant to trouble shoot facility problems, overseeing maintenance programs and providing project management or guidance for upgrades. There is an ongoing role that also oversees water distribution system operations. APEGGA professionals are also able to provide their expertise in risk assessment with regard to watersheds, facility design, water quality, operator certification and to conduct periodic audits of existing operations.

Likely to a lesser extent APEGGA professionals are also involved in monitoring activities as they relate to drinking water facilities. This may include the design of such monitoring systems, (e.g., where and how to conduct the monitoring), providing data interpretation (e.g., for health indicators and overall system performance/efficiency). Monitoring is also required to assess the performance of the distribution (including storage) system. As with the other areas, audits also involve APEGGA professionals.

Related to other APEGGA professional functions are activities that focus on the drinking water source and may involve watershed protection, risk assessment of surface and groundwater sources and ongoing audit functions related to existing sources.

From the regulatory perspective (e.g., Alberta Environment) and standards assurance, APEGGA professionals play an important part of reviewing all aspects of the design and process of the facility, ongoing operations assessments, and inspections. They are

involved in providing training, enforcement, setting standards for drinking water quality, conducting investigations into operations or operational failures, a resource to all operators and in the certification of system operators.

## **Recommendations**

The recommendations have been divided into two categories; general recommendations and recommendations on the role of APEGGA's professionals.

### **General Recommendations**

APEGGA has considered the recommendations of the Walkerton and North Battleford inquiries and the current Alberta drinking water regulatory framework. Alberta Environment has a good set of standards and the framework in place to provide safe drinking water. APEGGA makes the following recommendations to strengthen the delivery of safe drinking water:

- Facilities, regardless of size, should meet all of Alberta Environment's drinking water design and quality standards for the production and delivery of drinking water. Over an appropriate period of time all existing facilities should be upgraded or optimized to reflect current standards.
- All water utilities, regardless of size, should participate in source water protection, which may include monitoring of watershed sources.
- All facilities, regardless of size, should be required to have enhanced monitoring, including, but not limited to, continuous monitoring of treated water turbidity and disinfectant residual. Standards should also be set for monitoring and reporting throughout the distribution system, including reservoirs.
- All facilities, regardless of size, should be required to implement a quality management program that includes annual audits/assessments of the utility, its distribution system, and staff certification.
- All facilities, regardless of size, should support the continued training and certification of the individuals involved in the production of drinking water.

APEGGA professionals recognize that these areas are affected by other factors outside of their direct control and may include: funding, manpower complement, thorough knowledge of linkages across water systems from source to distribution, system complexity (unfamiliarity) from operating and maintenance perspectives, and associated governing regulatory frameworks. It is readily evident that funding and manpower areas, especially in smaller communities, are difficult to influence. However, efforts must be made to implement the above recommendations.

## **Recommendations on Roles of APEGGA's Professionals.**

The key role of APEGGA professionals is in their work to develop projects and public infrastructure, keep them operating efficiently, and making improvements as needed. The systems needed to provide safe drinking water for the public are within this scope. In recognizing this, APEGGA has the following recommendations regarding the role of APEGGA professionals in providing safe drinking water to the public:

- Enhancing the protection of the drinking water source through watershed protection, risk assessment of surface and groundwater sources, and ongoing audit functions related to existing sources;
- Increasing role in reviewing and implementing enhanced monitoring of water sources, plant operations and overall distribution systems resulting in simplicity of controls to yield better and safer quality of treated water;
- Supporting and participating in the operator certification process by defining and ensuring the requirements of water system operation tasks are made clear at the various certification levels;
- Enhancing and defining the roles and activities of the APEGGA professional throughout the operations of licensed water systems with specific emphasis on risk interpretation, policy review/input, and accountability;
- Recommending and selecting the best available technology for these sized facilities from the perspectives of design, operations, maintenance, and monitoring. (Each of these should be viewed with respect to process simplicity, automation and continuous operation/monitoring. Monitoring should be provided for treatment, storage, and distribution facilities, and source waters.);
- Promoting training for water treatment facility operators in all aspects of the facility, including monitoring of supply sources;
- Providing data analysis and facility trouble-shooting capability; and
- Supporting facility supervision.