

Ensuring Quality Drinking Water

Background

In May 2000, the drinking water in Walkerton, Ontario became contaminated with e-coli. More than 2,300 residents fell ill and seven people ultimately died. Officials identified the primary source of contamination as agricultural manure runoff into area water wells. The investigation found that the Walkerton public utility authority had neglected its responsibility to perform daily residual chlorine testing. The investigation also determined that Walkerton's water supply had been generally mismanaged, including inadequate chlorine dosing, monitoring, testing, and inspection.

The Walkerton contamination also produced enormous and far-reaching financial consequences. The economic impact was estimated at \$155 million minimum, including \$32 million spent by the Ontario government for lawyers and the public inquiry. These costs were borne not only by the people of Ontario but also by provincial taxpayers and insurance companies.

The Ontario government wanted to implement a system to ensure that this would not happen again.

Problem

Water quality concerns are universal. Governments and institutions such as the World Health Organization have established guidelines and regulations to protect people from the health threats of contaminated water. In Canada, each province regulates drinking water quality through provincial legislation. Ontario needed to add a mandated water system management process to guarantee that the systems providing drinking water functioned properly and the authorities managing them were anticipating and preventing problems.

Approach

The Ontario government asked the Canadian Standards Association (CSA) to develop the Drinking Water Quality Management Standard. This standard establishes requirements for the local Operating Authority to effectively manage the drinking water system.

The Walkerton inquiry discovered that no residual chlorine and turbidity monitors were located at the well that became contaminated. Furthermore, the Walkerton public utility authority had neglected its responsibility to perform daily residual chlorine testing. In addition, years of mismanagement had subjected the Walkerton water supply to inadequate chlorine dosing, monitoring, testing, and inspection.

To reduce the risk of such an incident recurring, CSA developed the Drinking Water Quality Management Standard, issued in October 2006. CSA based the standard on the ISO 9001 Quality Management standard and the ISO 14001 EMS. With the new standard, the requirements for licenses demanded that Drinking Water System Owners and Operating Authorities submit licensing and permitting applications plus an operational plan that complies with the standard. The Drinking Water Quality

Management Standard specified minimum components both for consumer protection and to meet legislative and regulatory requirements. The standard does not specify water quality criteria, but rather refers to relevant legislation and regulations such as the Safe Drinking Water Act.

The Drinking Water Quality Management Standard is a milestone for the ministry of the Environment (MOE) because it contains both 'Plan' and 'Do' elements for each function. The Operating Authority must produce an operational plan for a quality management system that meets the standard's requirements. Significantly, the standard also obligates the authority to act on the elements within the operational plan. They must both establish and maintain the standard.

The operational plan must document the drinking water system including source, treatment systems, and distribution network. It must also define a risk assessment process that includes identifying potential hazards, risks, and critical control points (Plan). In accordance with the plan, the Operating Authority must execute a risk assessment at least once every three years (Do). The Drinking Water Quality Management Standard requires critical thinking in both the design and the operation of a water treatment system because testing at the end of the process is inadequate; the authority must also plan for hazardous events and provide control measures and equipment reliability and redundancy. The Plan/Do mechanism establishes a complete process.

The standard also demands that a third-party Accreditation Body certify the Operating Authority against the standard's requirements. Accreditation prohibits conflict of interest, thereby bringing credibility to the entire drinking water management system.

Outcome

The Drinking Water Quality Management Standard was released in 2006. The Ontario Ministry of the Environment published the standard as legislation. The standard sets multiple layers of protection for drinking water. Its reference to the Safe Drinking Water Act addresses minimum drinking water quality levels. The standard also establishes requirements for a management system that considers the entire network and potential risks, from source to distribution. The standard demands a level of competence for all personnel involved and the third-party accreditation ensures objective evaluation. With both quality and management standards, Walkerton and the rest of Ontario can trust the purity of the water they drink.