

Chapter 12 The Certification and Training of Operators

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Chapter 12 The Certification and Training of Operators

12.1 Overview

There is no question that competent water operators are an essential element of a safe drinking water system. The evidence in Part 1 of the Inquiry pointed out the dangers of unqualified operators. The system now in place in Ontario satisfies many of the requirements in this area. Currently, the certification of operators is mandatory, and operators are required to receive continuous training. There is, however, room for improvement, and in this chapter I make several recommendations that I believe will achieve the goal of ensuring that water system operators are fully knowledgeable and capable of carrying out those tasks that are necessary to provide safe water to the communities they serve.

In 1993, the provincial government implemented mandatory certification. This is an essential component of a safe drinking water system. I specifically recommend its continuance. As well, I recommend that the use of grandparented operators – those experienced operators who were certified without examination – be phased out.

Regarding continuous operator training, I recommend that the Ministry of the Environment (MOE) consult with the drinking and wastewater industry to develop a curriculum focused on water safety and public health issues. Decisions regarding the number of hours of training and the content of the curriculum are best left to that consultation process. I also recommend that the government take steps to ensure that the necessary training is available for operators located in small and remote communities. Finally, I am of the view that the government should assist in the development of training materials and courses for water system operators.

12.2 Mandatory Certification

Recommendation 59: The Ministry of the Environment should continue to require the mandatory certification of persons who perform operational work in water treatment and distribution facilities. Education, examination, and experience are essential components of ensuring competence.

In June 1993, Ontario Regulation 435/93 was passed pursuant to section 75 of the *Ontario Water Resources Act*¹ and the certification of operators became mandatory. The administration of the certification program was transferred from the MOE to the Ontario Environmental Training Consortium (OETC).

The mandatory certification program for operators in Ontario seeks to

- provide safe drinking water to the residents of Ontario;
- ensure that operators have the required knowledge and experience to perform their duties safely and efficiently; and
- promote professionalism and establish and maintain standards for operators.²

Five provinces have established or are establishing mandatory operator certification requirements.³ Many U.S. states have established mandatory certification for waterworks operators.

Each waterworks facility that is capable of supplying water for human consumption at a rate greater than 50,000 L daily must be classified into one of four classes. Classification is based on the complexity of the facility, its source water quality, and the size of the population it serves.

Ontario Regulation 435/93 requires operators to be certified for the class of facility in which they work. The owner must ensure that every operator holds the appropriate licence applicable to the class of facility. Copies of the licences of each operator are to be posted by the owner at the facility.⁴

An individual at the beginning of a career as a waterworks operator must obtain an operator-in-training licence. A Grade 12 education is required, and the operator-in-training must pass an examination. Table 12.1 outlines the education, experience, and examination requirements that must be fulfilled for each class of licence.⁵

¹ R.S.O. 1990, c. O.40.

² A. Castel, Assistant Deputy Minister, 1993, memorandum to the Honourable C.J. Wildman, June 16.

³ B. Gildner, testimony, Walkerton Inquiry (Part 1 Hearing, June 7, 2001), transcript p. 60.

⁴ O. Reg. 435/93, s. 9.

⁵ See *ibid.*, s. 2; and Ontario Environmental Training Consortium, 2002, *Water and Wastewater Operator Licensing and Facility Classification Program Guide* <www.oetc.on.ca/programguide.htm>.

Table 12.1 Licence Requirements for Waterworks Operators in Ontario

	Education	Experience	Exam	Other
Operator-in-training	Grade 12 or equivalent	N/A	70% on operator-in-training exam	Cannot be in charge of a facility
Class 1	Grade 12 or equivalent	1 year of experience	70% on class 1 exam	
Class 2	Grade 12 or equivalent	3 years of experience	70% on class 2 exam	Must hold a class 1 licence
Class 3	Grade 12 or equivalent + 2 years of additional education or training	4 years of experience with at least 2 years as "operator-in-charge"	70% on class 3 exam	Must hold a class 2 licence
Class 4	Grade 12 or equivalent + 4 years of additional education or training	4 years of experience with at least 2 years as "operator-in-charge"	70% on class 4 exam	Must hold a class 3 licence

Licences must be renewed every three years.⁶ If the operator has not had experience operating a waterworks in the past five years, he or she is required to pass an examination as a condition of renewal of the licence.

As a result of the 1998 amendments to Ontario Regulation 435/93, a conditional licence can be granted if the owner of the facility cannot readily obtain the services of an operator licensed for that class of facility and undertakes to facilitate compliance with the conditions prescribed in the licence. This situation may occur if the facility's classification is upgraded, and the existing operators are not certified for that class of facility. A conditional licence may also be granted in small, isolated communities if an individual with proper qualifications is not available. The conditional licence is limited to the particular facility and is subject to the conditions prescribed by the director. It expires three years after it is issued, or earlier if that is specified in the licence.

Certification has three essential components: formal education, experience, and the successful completion of an examination. A formal education is necessary to ensure that the individual is literate, has problem-solving abilities, and possesses mathematical and other skills required to perform as an operator. In the past, people have been permitted to substitute training for a high school diploma. The successful completion of a high school diploma or equivalent education is a precondition to competency and should be enforced. Experience

⁶ O. Reg. 435/93, s. 6(7).

is also important for the operator to know how to respond appropriately to a variety of operating conditions. Finally, passing an examination helps ensure that the operator has the knowledge required to carry out his or her duties.

The government should continue to require mandatory certification of persons who perform operational work in water treatment and distribution facilities. The requirements for education, examination, and experience, are essential components of competency.

The government should also ensure that the certification program is adequately funded and staffed and has the necessary resources to support the program.

In the past several years, the MOE's certification program, administered by the OETC, has not been self-supporting and has operated at a deficit. Between 1996 and 1999, for example, the average annual expenditure for the certification program was approximately \$450,000. However, because revenues from applications for certification, renewals of licence, examination fees, and study materials have been approximately \$275,000, the program has operated at an annual deficit of \$175,000.⁷ Although the MOE has made some monetary contributions to the program, it continues to operate at a deficit. Both the Association of Boards of Certification (ABC), an organization that provides resources and guidance to certification authorities in the United States and Canada, and the U.S. Environmental Protection Agency (U.S. EPA) take the position that governments must provide sufficient resources to adequately fund and sustain the operator certification program.⁸

Moreover, the Ontario certification program does not have an adequate number of staff, according to the ABC standards. Ontario has approximately 6,500 certified operators and 4,000 individuals who hold operator-in-training certificates. The Ontario certification program has five full-time staff. According to the ABC standards, the certification program in Ontario should have a staff of eight.⁹

⁷ G. Samuel, for the Ontario Water Works Association and the Ontario Municipal Water Association, 2001, "Training and accreditation of water supply professionals," Walkerton Inquiry Submission, pp. 22–23.

⁸ Ibid.

⁹ Ibid.

12.3 Grandparented Operators

Recommendation 60: The Ministry of the Environment should require water system operators who currently hold certificates obtained through the grandparenting process to become certified through examination within two years, and it should require operators to be recertified periodically.

The MOE introduced a voluntary certification program for operators in the waterworks industry in 1987.¹⁰ The purposes of certification were to impart the necessary knowledge and skills to operators in the performance of their duties, to assure the safety of drinking water in Ontario, to establish operator standards, and to promote professionalism.

The certification standards of the ABC, which included the three components of education, experience, and examination, were adopted by the Ontario government.¹¹ It was hoped that the licence would become the standard expectation of Ontario operators and that, as a result, operators would voluntarily seek certification and owners would gradually require employees to be licensed.

In support of the voluntary program, the provincial government in 1987 developed the “Water and Wastewater Utility Operator Certification Program Guidelines”¹² pursuant to the *Ontario Water Resources Act*. A grandparenting provision was included in the guidelines in section 14(4) which stated that the Ontario Advisory Board of Certification for operators of water and wastewater utilities

may, at its discretion until April 1, 1990, waive the examination and/or education requirements for those operators who have demonstrated, through their past performance, their ability to operate, repair and maintain the utility, meet the experience requirements and have been recommended for certification by the owner or his representative.

The deadline for application was extended to October 1990.

¹⁰ Gildner, testimony, p. 17; Samuel, p. 2.

¹¹ Samuel, pp. 2–3.

¹² The guidelines were dated February 9, 1987.

Pursuant to the voluntary grandparenting program, an operator who satisfied the experience requirements could receive a licence without writing the certification exam or satisfying the education requirement. The operator was eligible for the level of licence at which the facility in which he or she worked had been classified; for example, if the operator worked in a class 3 facility, he or she would receive a class 3 licence.

Initially, the licence obtained under the voluntary certification program was restricted to the facility in which the operator worked; it was not valid if the operator sought employment or was transferred to another facility. This restriction was removed in 1991 because of concern among stakeholders that it unduly restricted operators from working in other facilities, particularly in circumstances in which a municipality had several water treatment or wastewater treatment facilities.¹³

The grandparenting provision was included for a number of reasons. It was intended to serve as a transition provision in the move from a non-regulated to a regulated industry. The purpose of voluntary certification was to make the licence the standard expectation of operators and owners; it was hoped that new operators would voluntarily seek certification and that owners would gradually begin to require licensing as a condition of employment. Another purpose of the grandparenting provision was to allow experienced operators to maintain their employment. Finally, the provision was included to ensure that there would be a sufficient number of experienced operators to meet Ontario's demands once certification became mandatory.¹⁴

When the mandatory certification of operators was introduced in 1993, there was another opportunity to apply for certification under a grandparenting provision. The deadline was February 1, 1994. Again, the operator could receive a class of licence equal to the facility in which he or she worked without writing a certification exam. However, unlike the 1987 provision, the operator was required to successfully complete the exam in the three-year period in which his or her licence was renewed. If the operator did not pass the exam, his or her level of licence was lowered by one class.¹⁵

¹³ Gildner, testimony, pp. 33–37.

¹⁴ M. Christie, testimony, Walkerton Inquiry (Part 1 Hearing, June 7, 2001), transcript pp. 34–35.

¹⁵ Gildner, testimony, pp. 49–51.

The requirement for writing an examination was applied differently for operators who had been grandparented in the 1987–90 period. These operators were not required to pass an examination as a condition of the renewal of their licences. They continued to be certified without ever having passed an examination. Approximately 5,000 licences were granted under the 1987 and 1993 grandparenting programs;¹⁶ the Inquiry heard that a significant number of certified operators remain who have never been required to pass an examination.

Grandparenting makes a good deal of sense as a transitional measure when moving to a mandatory certification model. It ensures a continued supply of operators for water providers and avoids the prospect of abruptly terminating many long-standing employees. Several jurisdictions introduced the concept of grandparenting when they first established an operator certification program. Alberta had a provision for grandparenting when it introduced mandatory certification in 1993. Most U.S. states and all the other Canadian provinces except Quebec resorted to the concept of grandparenting in their voluntary certification programs.¹⁷

However, for reasons of public safety and to ensure that operators are properly qualified to carry out their duties, it is important that over time all Ontario operators be required to pass a certification examination. Individuals who were grandparented in the 1987–90 period should be required to successfully complete the qualifying examination. It has now been nearly 14 years since voluntary certification was first introduced, and nearly 9 years since certification was made mandatory in Ontario. It is time to move ahead. Efforts should be made to ensure that the examination process accommodates any study or exam-writing difficulties that long-standing employees may have. At the same time, efforts should be made to ensure that these employees have the knowledge required to protect public health and safety. This approach is in conformity with the guidelines of the United States Environmental Protection Agency, which require that within a specified time, grandparented operators meet all the requirements for certification.¹⁸

¹⁶ Samuel, p. 3.

¹⁷ Gildner, testimony, pp. 60–61.

¹⁸ Ibid.; and United States Environmental Protection Agency, 1994, “Final Guidelines for the Certification and Recertification of the Operator of Community and Nontransient Noncommunity Public Water Systems” <www.epa.gov/ogwdw/opcert/opguide.html> [accessed May 6, 2002].

Requiring all operators in Ontario to successfully complete the certification exam will help ensure that these individuals have the knowledge, skills, and judgment to perform their jobs and in turn help ensure the safety of drinking water in the province. Operators who received licences under the voluntary grandparenting program should be required to meet the same standards as other certified operators.

It is also important that licences received under the grandparenting program be site-specific and non-transferable. If grandparented operators choose to work for another water system, they should be required to meet the certification requirements for that system. I note that the U.S. EPA also recommends that licences received under grandparenting be site-specific and non-transferable.¹⁹

12.4 New Operators

Recommendation 61: The Ministry of the Environment should require all applicants for an operator's licence at the entry level to complete a training course that has a specific curriculum to ensure a basic minimum knowledge of principles in relevant subject areas.

Individuals who wish to become operators of a water utility are required to have a high school diploma and pass an examination. Candidates prepare for the examination by obtaining materials from the OETC Web site or from other sources. At present, it is not necessary for a prospective operator to complete a training course that has a specific curriculum. It is possible for an individual to pass the certification exam with no knowledge of, or experience in, one or more specific subjects. Currently, training is required only after the individual has been certified.

The importance of acquiring information at the entry level in particular areas is essential for ensuring the safety of drinking water. For this reason, an entry-level mandatory training course should be developed to ensure that all certified operators have been exposed to, and have demonstrated knowledge of, the basic principles underlying the provision of safe drinking water. This course should include information on the treatment and monitoring of drinking water, the health risks associated with drinking water, the statutes and regulations pertinent to the protection of drinking water, the impact on public health of

¹⁹ Gildner, testimony, p. 62; and U.S. EPA.

the failure to properly treat and monitor the water, and contingency or emergency procedures. After successfully completing the mandatory entry-level training course and the certification examination, operators-in-training should be “shadowed” by an experienced individual to ensure that they perform their duties correctly and safely.

12.5 The Training of Certified Operators

Recommendation 62: The Ministry of the Environment should develop a comprehensive training curriculum for operators and should consolidate the current annual training requirement in Ontario Regulation 435/93 and the proposed requirement of ministry-approved training into a single, integrated program approved by the Ministry of the Environment.

In the Part 1 report of this Inquiry, I made several recommendations regarding operator training. The above recommendation and the following discussion include the substance of those recommendations.

Section 17(1) of Ontario Regulation 435/93 requires the owner of a facility to take measures to ensure that each operator employed in the facility receives a minimum of 40 hours of training each year. The purpose of the annual training or professional development is to ensure that operators continuously refresh their skills and acquire knowledge about new developments in their field, remain aware of risks to public health, and understand the measures that must be taken in the event of an emergency. Section 17(2) of the regulation provides examples of types of training that may satisfy the 40-hour requirement, such as training in new or revised operating procedures, reviewing existing operating procedures, safety training, and studying information and acquiring technical skills related to environmental issues.

Several problems have arisen in the context of the 40 required hours of operator training. One problem is the broad description of “training” in the regulation. The definition of training is largely within the discretion of the owner of the facility. Evidence at the Part 1 hearings suggested that spending the entire 40 hours of training on workplace safety would not contravene the regulation.²⁰ There is currently no requirement that training focus on technical issues involving water treatment or human health, such as the significance of pathogens

²⁰ Gildner, testimony, pp. 160–161.

in drinking water. In addition, there is no requirement that training be tailored to the class of facility in which the operator works.

A further problem is that the Ontario government has inconsistently enforced this provision. For example, as was discussed in the Part 1 report of this Inquiry, operators of the Walkerton Public Utilities Commission did not receive the appropriate training. The manager and the foreman of the Walkerton waterworks did not take the required hours of training. Moreover, the training that they did take did not address water safety or public health issues. The manager considered training to include the time he spent with an MOE inspector in the 1998 inspection of the Walkerton facility as well as the explanation of the water system to a new employee.

The MOE is unaware whether operators in a facility are satisfying the requisite training hours from year to year; only during the three-year inspection of the facility do MOE officials generally verify whether the requirement of section 17(1) of the regulation has been met. Although section 17(4) states that owners shall provide copies of summaries of training records to the director “when requested to do so,” this rarely occurs.

The government has proposed that Regulation 435/93 be amended to include a provision that requires an operator to obtain 36 hours of MOE-approved training every three years as a condition of licence renewal. It is the operator’s responsibility to acquire the requisite number of hours of continuing education. A prescribed number of hours of annual continuing education is endorsed by both the Association of Boards of Certification and the United States Environmental Protection Agency.²¹

It is contemplated that the 36 hours of continuing education will consist of formal courses, that the courses will be taught by qualified instructors, and that operators will be tested or evaluated at the conclusion of the course. The continuing education courses must be approved by the government. The purpose of such a requirement is to ensure that operators are knowledgeable in such areas as the applicable statutory and regulatory provisions on drinking water, emerging pathogens, the importance of the treatment and monitoring of drinking water to public health, and the measures to be taken in the event of an emergency.

²¹ Ibid., p. 228.

In my view, the MOE should develop a comprehensive training curriculum for each class of operator and consolidate the current training requirements in Ontario Regulation 435/93 with the proposal of MOE-approved continuing education for operators. It should prescribe the particular type of training required for class 1 to 4 operators. It should designate and approve both the courses that must be taken in the various subject areas and the number of hours of training required annually. The mandatory training program should focus on the protection of public health and the safety of drinking water systems and should prescribe the number of hours to be devoted to such issues as the risk of pathogens in water, the treatment and monitoring of drinking water, and measures designed to lessen risks to public health.

To ensure that the training requirements are met, the MOE should require that annual records be forwarded to them that specify the particular training taken by each operator at a facility. To facilitate the enforcement of mandatory training, the MOE should develop a standardized form that lists the name and position of operators who attended training sessions, the dates and duration of the sessions, and the subjects covered at each session. This will assist MOE officials and inspectors in assessing compliance with the training requirements.

12.6 The Training of Operators in Small and Remote Communities

Recommendation 63: The Ministry of the Environment should take measures to ensure that training courses are accessible to operators in small and remote communities and that the courses are tailored to meet the needs of the operators of these water systems.

Operators of water systems in small and remote communities must satisfy the annual 40-hour professional development requirement prescribed in section 17 of Ontario Regulation 435/93. It is also proposed that they should be obliged to fulfill the required hours of MOE-approved continuing education when this regulation comes into effect. A number of operators have not been fulfilling the 40-hour requirement stipulated in the regulation.²² Travel to and from, and participation in, training courses may require operators to be away from their communities for several days. Those in small and remote communities

²² E.E. Geldreich and J.E. Singley, 2002, "Ontario water suppliers: Two experts' assessments," Walkerton Inquiry Commissioned Paper 24, p. 5.

have difficulty obtaining the required training because few individuals are available to replace them during their absence from the facility. In addition, owners of such facilities have been reluctant to fund this training because of the cost of the courses, transportation, and accommodation.

It is important that training courses be accessible to operators in these communities and that courses be designed to address operator information and operational needs. In contrast to operators in large municipalities, who may perform a narrow range of tasks, operators in water systems in small communities are generally involved in all aspects of operating the system. Training courses should be developed to address the knowledge required to safely and efficiently operate these systems. CD-ROM training packages, video-conferences, and online courses, such as those that have been developed in the United States by the American Water Works Association and the Water Environment Federation, should be evaluated and, if suitable, introduced or developed to improve the access of operators in small and remote communities to continuous education and training courses.

12.7 Training Materials

The existence of good training materials for operators will help ensure the delivery of safe drinking water to the residents of Ontario. Some of the existing materials have been criticized for focusing on examination preparation rather than on job performance. It has also been said that some of the materials emphasize what must be done rather than providing reasons for following particular procedures. Training materials for each class of operator should be assessed to ensure that the necessary information is conveyed, and they should be updated continuously to reflect new statutory and regulatory provisions, discoveries of new pathogens and public health risks, new methods for treating and monitoring drinking water, and new technological developments.

12.8 Providing Quality Training Courses on Diverse Subjects

Recommendation 64: The Ministry of the Environment should meet with stakeholders to evaluate existing training courses and to determine the long-term training requirements of the waterworks industry. The ministry should play an active role in ensuring the availability of an array of courses on the subjects required to train operators.

Providing an adequate number of courses that offer quality training in various regions of Ontario is essential for ensuring that operators in the water industry have the requisite skills, knowledge, and judgment to perform their work. The provincial government was involved in training from the 1960s to the 1990s. This involvement has dissipated with the result that an insufficient number of quality courses are available to operators in Ontario. Neither the private sector nor community colleges have completely filled the void.²³

The Ontario Water Resources Commission, the predecessor to the MOE, began to offer training courses to operators in 1959. Courses were further developed by the provincial government in the 1960s, and in 1970 a training centre was established in Brampton.²⁴ The courses at that time were primarily operational and were intended to impart information on the functioning of water systems.

As a result of the introduction of voluntary certification in 1987 and the anticipated need for more training courses, the MOE established the Ontario Environmental Training Consortium (OETC). The main purposes of the OETC were to increase training opportunities for operators in the province, to relieve pressure on the Brampton facility, and to create linkages between the MOE and community colleges.²⁵ A dual approach was endorsed: the MOE retained the training centre in Brampton, and community colleges offered courses to operators in other parts of the province.

Between 1974 and 1995, more than 17,600 people attended courses at the MOE training centre in Brampton. From 1990 to 1995, an additional 1,450 people participated in OETC courses offered through community colleges.²⁶ The OETC did not directly provide the training; rather, it served as an administrative or coordinating body for the community colleges. Sixteen colleges, from Thunder Bay to Ottawa, offered courses that were audited by the MOE. Drinking water specialists and MOE officials taught courses on various subjects, including water treatment, distribution systems, surface water, gas chlorination, hypochlorination, small water systems, and laboratory skills for plant operators.

²³ Samuel, p. 24.

²⁴ Gildner, testimony, p. 121.

²⁵ Samuel, p. 5.

²⁶ Gildner, testimony, p. 124.

Before 1990, the courses offered by the MOE were heavily subsidized. However, to ensure that the community colleges could provide the courses, the subsidy for the MOE courses was no longer available after 1990. The cost of training courses increased from approximately \$60 to \$500/\$600, and many public utilities were unable or reluctant to absorb the course fees for operators in their facilities. Large municipalities began to develop their own training programs, and courses in the private sector became available. As a result, the number of operators enrolled in the courses decreased.²⁷

In 1995, the Brampton MOE training centre was closed and the OETC stopped coordinating the courses offered by the community colleges. The MOE transferred the responsibility for the training of operators to the Ontario Clean Water Agency (OCWA). However, by 1999, the OCWA restricted its courses to its own staff, and municipal operators were precluded from attending the OCWA training courses.²⁸

Some community colleges continue to offer courses based on demand. They do not, however, provide the array of courses previously available, when the OETC coordinated the program. Although private sector training does exist, the quality of some courses has been questioned. No process currently exists to systematically evaluate the quality of operator training courses offered in Ontario.

Although I do not consider it essential for the MOE to offer training courses directly to water system operators, the ministry should, in consultation with the industry, community colleges, and private sector training organizations, ensure that adequate courses are available. There is little point in requiring MOE-approved training for certified operators if the courses necessary to fulfill the requirement are not available.

On the subject of training, I received submissions from the Centre for Water Quality Committee (CWQC) regarding the establishment of a Walkerton Centre for Water Quality. One of the purposes of the centre would be to coordinate training for water system operators. In my view there is merit in a coordinating body and I suggest that the province examine carefully the proposal made by CWQC.

²⁷ Christie, testimony, p. 126; Gildner, testimony, pp. 128–129.

²⁸ Samuel, p. 6.

