

Chapter 1 Introduction

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Chapter 1 Introduction

1.1 Background

Until May 2000, there was little to distinguish Walkerton from dozens of small towns in southern Ontario. It is a pretty town, located at the foot of gently rolling hills, along the banks of the Saugeen River. Walkerton traces its history back to 1850, when Joseph Walker, an Irish settler, built a sawmill on the river, starting a settlement that adopted his name. In time, it became the county seat for Bruce County. The name survived an amalgamation in 1999, when Walkerton was joined with two farming communities to form the Municipality of Brockton. Walkerton has kept its small-town look and feel. Many of its 4,800 residents make their living from businesses that serve the surrounding farms.

In May 2000, Walkerton's drinking water system became contaminated with deadly bacteria, primarily *Escherichia coli* O157:H7.¹ Seven people died, and more than 2,300 became ill. The community was devastated. The losses were enormous. There were widespread feelings of frustration, anger, and insecurity.

The tragedy triggered alarm about the safety of drinking water across the province. Immediately, many important questions arose. What actually happened in Walkerton? What were the causes? Who was responsible? How could this have been prevented? Most importantly, how do we make sure this never happens again?

The government of Ontario responded by calling this Inquiry. I have divided the mandate of the Inquiry into two parts. The first, which I refer to as Part 1, relates only to the events in Walkerton. It directs me to inquire into the circumstances that caused the outbreak – including, very importantly, the effect, if any, of government policies, procedures, and practices. The second, Part 2, goes beyond the events in Walkerton, directing me to look into other matters I consider necessary to ensure the safety of Ontario's drinking water. The overarching purpose of both parts of the Inquiry is to make findings and recommendations to ensure the safety of the water supply system in Ontario.

Because of their importance to the community, the hearings for Part 1 were held in Walkerton. Over the course of nine months, the Inquiry heard from

¹ The abbreviation for *Escherichia coli*, *E. coli*, is frequently used in this report.

114 witnesses, including residents of the town, local officials, senior civil servants, two former ministers of the environment, and the Premier. This report outlines my findings and recommendations for Part 1 of the Inquiry.

The Part 2 process has also been completed, and I expect to deliver my report for Part 2 in approximately two months.

I would encourage those who are interested to read the report in full. For convenience, however, I begin this report with a brief summary, in point form, of my most significant conclusions.² That is followed by an overview of the entire Part 1 report and then, beginning in Chapter 2, by the full text of the report itself.

1.2 Summary of Conclusions

- Seven people died, and more than 2,300 became ill. Some people, particularly children, may endure lasting effects.
- The contaminants, largely *E. coli* O157:H7 and *Campylobacter jejuni*, entered the Walkerton system through Well 5 on or shortly after May 12, 2000.
- The primary, if not the only, source of the contamination was manure that had been spread on a farm near Well 5. The owner of this farm followed proper practices and should not be faulted.
- The outbreak would have been prevented by the use of continuous chlorine residual and turbidity monitors at Well 5.
- The failure to use continuous monitors at Well 5 resulted from shortcomings in the approvals and inspections programs of the Ministry of the Environment (MOE). The Walkerton Public Utilities Commission (PUC) operators lacked the training and expertise necessary either to identify the vulnerability of Well 5 to surface contamination or to understand the resulting need for continuous chlorine residual and turbidity monitors.

² Reference should be made to the report itself for the precise wording of my conclusions and for qualifications on those conclusions.

- The scope of the outbreak would very likely have been substantially reduced if the Walkerton PUC operators had measured chlorine residuals at Well 5 daily, as they should have, during the critical period when contamination was entering the system.
- For years, the PUC operators engaged in a host of improper operating practices, including failing to use adequate doses of chlorine, failing to monitor chlorine residuals daily, making false entries about residuals in daily operating records, and misstating the locations at which microbiological samples were taken. The operators knew that these practices were unacceptable and contrary to MOE guidelines and directives.
- The MOE's inspections program should have detected the Walkerton PUC's improper treatment and monitoring practices and ensured that those practices were corrected.
- The PUC commissioners were not aware of the improper treatment and monitoring practices of the PUC operators. However, those who were commissioners in 1998 failed to properly respond to an MOE inspection report that set out significant concerns about water quality and that identified several operating deficiencies at the PUC.
- On Friday, May 19, 2000, and on the days following, the PUC's general manager concealed from the Bruce-Grey-Owen Sound Health Unit and others the adverse test results from water samples taken on May 15 and the fact that Well 7 had operated without a chlorinator during that week and earlier that month. Had he disclosed either of these facts, the health unit would have issued a boil water advisory on May 19, and 300 to 400 illnesses would have been avoided.
- In responding to the outbreak, the health unit acted diligently and should not be faulted for failing to issue the boil water advisory before Sunday, May 21. However, some residents of Walkerton did not become aware of the boil water advisory on May 21. The advisory should have been more broadly disseminated.
- The provincial government's budget reductions led to the discontinuation of government laboratory testing services for municipalities in 1996. In implementing this decision, the government should have enacted a regulation mandating that testing laboratories immediately and directly

notify both the MOE and the Medical Officer of Health about adverse results. Had the government done this, the boil water advisory would have been issued by May 19 at the latest, thereby preventing hundreds of illnesses.

- The provincial government's budget reductions made it less likely that the MOE would have identified both the need for continuous monitors at Well 5 and the improper operating practices of the Walkerton PUC.
- This report contains some recommendations directed toward ensuring the safety of drinking water in Ontario. However, the majority of my recommendations in that respect will be in the Part 2 report of this Inquiry.

1.3 An Overview of This Report

1.3.1 The Impact on Walkerton

The first indications of widespread illness began to emerge on Thursday, May 18, 2000. Twenty children were absent from Mother Teresa School, and two children were admitted to the Owen Sound hospital with bloody diarrhea. On Friday, May 19, there was an enteric outbreak among residents of a retirement home. People began to contact the Walkerton hospital, other nearby hospitals, and local physicians to complain of symptoms of enteric illness, including bloody diarrhea, stomach pain, and nausea. More students stayed home from school.

Over the next several days, illness spread quickly in the community. The Walkerton hospital was inundated with telephone calls and with patients visiting the emergency department. Patients were airlifted from Walkerton to London for emergency treatment. The first person died on Monday, May 22.

The story of the outbreak involves much more than a description of the clinical symptoms of the illnesses, the medical treatment, and the numbers of people who became ill and died. Most important are the stories of the suffering endured by those who were infected; the anxiety of their families, friends, and neighbours; the losses experienced by those whose loved ones died; and the uncertainty and worry about why this happened and what the future would bring.

In July 2000, I convened four days of hearings in Walkerton and invited the people of the town to come and talk about the impact of the outbreak on their lives. There were more than 50 presentations: some by individuals, some by groups, and others by families. Some were made in public, and others, when requested, in private. Those stories told a tale of great pain and suffering. They are a vital part of this Inquiry. I have summarized some of these stories in Chapter 2 of this report. Transcripts of all of these stories are part of the public record of the Inquiry and will remain as a lasting account of the hardship endured by the community.

1.3.2 The Bacteria

The vast majority of the deaths and illnesses in Walkerton were caused by two bacteria, *E. coli* O157:H7 and *Campylobacter jejuni*.³ *E. coli* O157:H7 is a subgroup of *E. coli*. A person infected with *E. coli* O157:H7 experiences intestinal disease lasting on average four days, but sometimes longer. After 24 hours, the person often experiences bloody diarrhea, and in some cases very severe abdominal pain. The illness usually resolves itself without treatment, other than rehydration and electrolyte replacement.

For some people, particularly children under five years of age and the elderly, *E. coli* O157:H7 infection can have more serious consequences. It may cause hemolytic uremic syndrome (HUS) after five to ten days of infection, leading to anemia, low platelet counts, acute kidney failure, and in some cases death.

Campylobacter jejuni, the most common type of *Campylobacter*, was also implicated in the Walkerton outbreak. With *Campylobacter*, diarrhea usually lasts two to seven days, and the fatality rate is much lower than for *E. coli* O157:H7.

Cattle are a common source of *E. coli* O157:H7 and *Campylobacter*. The bacteria can thrive in the gut and intestines of cattle, are commonly found in cattle manure, and can survive in the environment for extended periods. These bacteria may be transmitted to humans in a number of different ways, one of which is through drinking water.

³ Disease-causing agents such as bacteria are referred to as “pathogens,” a term generally used elsewhere in this report.

1.3.3 The Events of May 2000

The Walkerton water system is owned by the municipality. For years it was operated by the Walkerton Public Utilities Commission (PUC). Stan Koebel was the PUC's general manager, and his brother Frank Koebel was its foreman.

In May 2000, the water system was supplied by three groundwater sources: Well 5, Well 6, and Well 7. The water pumped from each well was treated with chlorine before entering the distribution system.

I have concluded that the overwhelming majority of the contaminants, if not all of them, entered the water system through Well 5.⁴ I have also concluded that the residents became exposed to the contamination on or shortly after May 12.

It rained heavily in Walkerton from May 8 to May 12: 134 mm of rain fell during these five days. The heaviest rainfall occurred on Friday, May 12, when 70 mm fell.

During the period from May 9 to May 15, Well 5 was the primary source pumping water into the distribution system. Well 6 cycled on and off periodically, and Well 7 was not in operation.

On Saturday, May 13, Frank Koebel performed the routine daily check of the operating wells. The purpose of the daily checks was to record data on pumping rate flows and chlorine usage, and, most importantly, to measure the chlorine residuals in the treated water.⁵ However, for more than 20 years, it had been the practice of PUC employees not to measure the chlorine residuals on most days and to make fictitious entries for residuals in the daily operating sheets. Stan Koebel often participated in this practice.

On May 13, Frank Koebel did not measure the chlorine residual at Well 5. It is very likely that at this time, *E. coli* O157:H7 and *Campylobacter* bacteria were overwhelming the chlorine being added at the well and were entering into the distribution system. Had Mr. Koebel measured the chlorine residual, he would

⁴ Although there is some evidence that Well 6 was susceptible to surface contamination, there is no evidence to support a finding that contamination entered the system through Well 6 during the critical period.

⁵ One of the purposes of measuring chlorine residuals is to determine whether contamination is overwhelming the disinfectant capacity of the chlorine that has been added to the water.

almost certainly have learned that there was no residual – a result that should have alerted him to the problem so that he could take the proper steps to protect the system and the community.

The next day, Sunday, May 14, Frank Koebel again checked Well 5. He followed the usual procedure and did not measure the chlorine residual. The same omission occurred on Monday, May 15, although it is not clear which PUC employee checked Well 5 on that day. Well 5 was turned off at 1:15 p.m. on May 15.

On the morning of May 15, Stan Koebel returned to work after having been away from Walkerton for more than a week. He turned on Well 7 at 6:15 a.m. Shortly after doing so, he learned that a new chlorinator for Well 7 had not been installed and that the well was therefore pumping unchlorinated water directly into the distribution system. He did not turn off the well; rather, he allowed the well to operate without chlorination until noon on Friday, May 19, when the new chlorinator was installed.⁶

On the morning of May 15, another PUC employee, Allan Buckle, took three water samples for microbiological testing. The sampling bottles were labelled “Well 7 raw,” “Well 7 treated,” and “125 Durham Street.” I am satisfied that these samples were not taken at the locations indicated, but rather were most likely taken at the Walkerton PUC workshop, which is near to and downline from Well 5. It was not unusual for PUC employees to mislabel the bottles so that they did not reflect the actual locations at which water samples were taken.

The samples taken by Mr. Buckle, together with one other sample taken from the distribution system by Stan Koebel and three samples from a watermain construction site in town, were forwarded to A&L Canada Laboratories for testing. These samples are very significant, for reasons I explain below.

The samples were received by A&L on Tuesday, May 16. It takes a minimum of 24 hours to perform microbiological tests. On Wednesday, May 17, A&L telephoned Stan Koebel and advised him that the three samples from the construction site, which came from water pumped from the Walkerton distribution system, were positive for *E. coli* and total coliforms.

⁶ After Well 5 was turned off at 1:15 p.m. on May 15, Well 7 was the only source of supply until Well 5 was turned on again on Saturday, May 20. Well 6 did not operate during this time.

A&L also reported to Mr. Koebel that the Walkerton water system samples “didn’t look good either.” One of those samples had undergone the more elaborate membrane filtration test, and the resulting plate was “covered” with total coliforms and *E. coli*. A&L faxed the results from the construction site samples to the PUC that morning and faxed those from the Walkerton water system samples in the early afternoon. The faxed report showed that three of the four samples from the Walkerton system had tested positive for total coliforms and *E. coli*, and that the samples that had undergone membrane filtration testing showed gross contamination.

A&L did not forward these results to the MOE’s area office in Owen Sound. As a result, the local health unit⁷ was not notified of the results until six days later, on May 23. I discuss the significance of this delay below.

The first public indications of widespread illness occurred on Thursday, May 18.⁸ Two children were admitted to the Owen Sound hospital with symptoms including bloody diarrhea, a large number of children were absent from school, and members of the public contacted the Walkerton PUC office to inquire about the safety of the water. A staff member, who discussed the matter with Stan Koebel, assured them that the water was safe.

The next day, the scope of the outbreak grew quickly. More students stayed home from school. Residents in a retirement home and a long-term care facility, along with many others in the community, developed diarrhea and vomiting. A local doctor saw 12 or 13 patients with diarrhea.

Also on that day, Dr. Kristen Hallet, a pediatrician in Owen Sound, suspecting that the illnesses of the two children admitted to the hospital the previous day had been caused by *E. coli*, contacted the local health unit. The health unit began an investigation, during which its staff spoke to persons in authority at schools, the local hospitals, and the retirement home in Walkerton, as well as to the PUC’s general manager, Stan Koebel.

When the health unit reached Mr. Koebel by telephone in the early afternoon of Friday, May 19, he was told that a number of children were ill with diarrhea and stomach cramps, and he was asked whether there was any problem with

⁷ The Bruce-Grey-Owen Sound Health Unit.

⁸ People had begun to experience symptoms several days before this, but there do not appear to have been public indications of an outbreak until May 18.

the water. Mr. Koebel replied that he thought the water was “okay.” By then, he knew of the adverse results from the May 15 samples. He did not disclose the adverse results in the conversation with the health unit, nor did he disclose the fact that Well 7 had operated without a chlorinator from May 15 until noon that day. During another call from the health unit later that afternoon, Mr. Koebel repeated his assurances about the safety of the town’s water.

The health unit did not issue a boil water advisory until two days later, on Sunday, May 21, at 1:30 p.m. I am satisfied that if Mr. Koebel had been forthcoming with the health unit on May 19 about the adverse sample results or about the fact that Well 7 had operated without chlorination, as he should have been, a boil water advisory would have been issued that day.

After speaking with staff of the health unit on May 19, Mr. Koebel began to flush and superchlorinate the system. He continued to do so throughout the following weekend. As time passed, he successfully increased the chlorine residuals both at the wellheads and in the distribution system.

I am satisfied that Mr. Koebel was concerned during the weekend about people becoming ill from the water and that he did not know that *E. coli* could be fatal. He believed that superchlorinating the water would destroy any contaminants present in the water. However, I am also satisfied that Mr. Koebel withheld information from the health unit because he did not want health officials to know that he had operated Well 7 without a chlorinator. He knew that having done so was unacceptable and was concerned that the operation of Well 7 without a chlorinator would come to light. There is no excuse for Mr. Koebel’s concealing this information from the health unit. Ironically, it was not the operation of Well 7 without a chlorinator that caused the contamination of Walkerton’s water. As I said above, the contamination entered the system through Well 5, from May 12 (or shortly afterward) until that well was shut off at about 1:15 p.m. on May 15.

As early as Thursday, May 18, and Friday, May 19, some people in the community believed that there was something wrong with the water and began to take steps to prevent further infection. For example, on May 19, Brucelea Haven, a long-term care facility, decided to boil the municipal water or use bottled water. Mr. and Mrs. Reich, whose seven-year-old daughter had been admitted to the hospital in Owen Sound, decided that their family, as well as their employees, should drink only bottled water.

On Saturday, May 20, a stool sample from one of the children at the Owen Sound hospital tested positive for *E. coli* O157:H7 on a presumptive basis. By this time, the outbreak was expanding very rapidly.

On May 20, the health unit spoke to Stan Koebel on two occasions. Mr. Koebel informed the health unit of the chlorine residuals in the system, but again he did not reveal the results from the May 15 samples or the fact that Well 7 had been operated without chlorination. The health unit took some comfort about the safety of the water from Mr. Koebel's reports that he was obtaining chlorine residual measurements in the distribution system. Over the course of the day, as concern spread within the community, the health unit relied on what Mr. Koebel said and assured callers that the water was not the problem.

On Saturday afternoon, Robert McKay, an employee of the Walkerton PUC, placed an anonymous call to the MOE's Spills Action Centre (SAC), which functions as an environmental emergency call centre. Mr. McKay was aware of the adverse results from the construction site, but not of those from the other samples taken on May 15. He informed the SAC that samples from Walkerton's water system had failed lab tests.

An SAC staff member contacted Stan Koebel that day in the early afternoon. Mr. Koebel led the caller to believe that the only recent adverse results from the system were those from the construction project. He did not reveal that there had also been adverse results from the distribution system samples.

Also on Saturday afternoon, staff at the health unit contacted Dr. Murray McQuigge, the local Medical Officer of Health, at his cottage. He returned to Owen Sound to direct the investigation.

Shortly after noon on Sunday, May 21, the laboratory at the Owen Sound hospital confirmed the earlier presumptive test for *E. coli* O157:H7 and announced an additional presumptive result from another patient. This was the first occasion on which there was confirmation of the specific pathogen involved. The health unit responded by issuing a boil water advisory that afternoon at 1:30 p.m. The boil water advisory was broadcast on the local AM and FM radio stations, but not on the local CBC radio station, on television, or by way of leaflets. Some people in the community did not become aware of the advisory that day. Dr. McQuigge called Brockton's mayor directly to advise him, but did not ask him to do anything, and the mayor took no steps to further disseminate the warning to the community.

In the afternoon of Sunday, May 21, Stan Koebel received calls from the health unit and the SAC. Again, he did not disclose the adverse results from the May 15 samples. The health unit took water samples from 20 different locations in the distribution system and that evening delivered them to the Ministry of Health laboratory in London for microbiological testing.

Throughout the day of May 21, there was a rapid increase in the number of people affected by the contamination. By the end of the day, the Walkerton hospital had received more than 270 calls concerning symptoms of diarrhea and serious abdominal pain. A child, the first of many, was airlifted from Walkerton to London for emergency medical attention.

On Monday, May 22, at the urging of the health unit, the MOE began its own investigation of the Walkerton water system. When the MOE asked Stan Koebel if any unusual events had occurred in the past two weeks, he told them that Well 6 had been knocked out by an electrical storm during the weekend of May 13, but he did not mention the operation of Well 7 without a chlorinator or the adverse results from the May 15 samples.

When asked by the MOE for documents, Mr. Koebel produced, for the first time, the adverse test results faxed to him by A&L on May 17. He also produced the daily operating sheets for Wells 5 and 6 for the month of May but said he could not produce the sheet for Well 7 until the next day. Later, he instructed his brother Frank Koebel to revise the Well 7 sheet with the intention of concealing the fact that Well 7 had operated without a chlorinator.

On Tuesday, May 23, Mr. Koebel provided the MOE with the altered daily operating sheet for Well 7. That day, the health unit was advised that two of the water samples it had collected on May 21 had tested positive for *E. coli*. Both these samples were from “dead ends” in the system, which explains why the contaminants were still present after Mr. Koebel’s extensive flushing and chlorination over the weekend. When informed of these results, Stan Koebel told the health unit about the adverse samples from May 15 for the first time.

By Wednesday, May 24, several patients had been transferred by helicopter and ground ambulance from Walkerton to London for medical attention. The first person died on May 22, a second on May 23, and two more on May 24. During this time, many children became seriously ill, and 27 people developed HUS. Some will probably experience lasting damage to their kidneys as well as other long-term health effects. In all, 7 people died and more than 2,300 became ill.

1.3.4 The Physical Causes

As mentioned above, I have concluded that microbiological pathogens – namely, *E. coli* O157:H7 and *Campylobacter jejuni* bacteria – entered Walkerton’s water system through Well 5 starting on or shortly after Friday, May 12.

The extraordinary rainfall between May 8 and May 12, 2000, greatly assisted the transport of the contaminants to the entry point for Well 5. Well 5 was a shallow well: its casing extended just 5 m below the surface. All of its water was drawn from a very shallow area between 5 m and 8 m below the surface. More significantly, the water was drawn from an area of highly fractured bedrock. Because of the nature of the fracturing, the geology of the surrounding bedrock, and the shallowness of the soil overburden above the bedrock, it was possible for surface bacteria to quickly enter into a fractured rock channel and proceed directly to Well 5.

The primary, if not the only, source of the contaminants was manure that had been spread on a farm near Well 5 during late April 2000. DNA typing of the animals and the manure on the farm revealed that the *E. coli* O157:H7 and *Campylobacter* strains on the farm matched strains that were prevalent in the human outbreak in Walkerton. It is important to note that the owner of this farm is not to be faulted in any way. He used what were widely accepted as best management practices in spreading the manure.

Water samples taken from the system support the conclusion that Well 5 was the entry point for the contamination. The first test results indicating *E. coli* contamination in the system were from the samples collected on May 15. These samples were probably taken from a location near and immediately downline from Well 5 – the PUC workshop. In the immediate aftermath of the outbreak, beginning on May 23, the raw water at Well 5 consistently tested positive for *E. coli*. Significantly, tests of the raw water at Wells 6 and 7 during this period did not show the presence of *E. coli*. The experts who testified agreed that there was “overwhelming evidence” that the contamination entered through Well 5.

It is not possible to determine the exact time when contamination first entered the system. I conclude, however, that the residents of Walkerton were probably first exposed on or shortly after May 12. This conclusion is supported by the epidemiological evidence, the evidence of the health care institutions that treated the ill and vulnerable groups, anecdotal evidence from residents, and the timing of the heavy rainfall. It is also consistent with the findings of the Bruce-Grey-

Owen Sound Health Unit and of Health Canada, which both concluded that the predominant exposure dates were between May 13 and May 16, 2000.

Well 5 was the primary source of water during the period when contamination entered the system, while Well 6 cycled on and off, and Well 7 was not in operation.

The applicable government document, the Chlorination Bulletin,⁹ required a water system like Walkerton's to treat well water with sufficient chlorine to inactivate any contaminants in the raw water, and to sustain a chlorine residual of 0.5 mg/L of water after 15 minutes of contact time.¹⁰ One important purpose of the chlorine residual is to retain a capacity for disinfection in treated water as it moves throughout the distribution system. Another is to provide a way to determine whether contamination is overwhelming the disinfectant capacity of the chlorine that has been added to the water. If the required chlorine residual of 0.5 mg/L had been maintained at Well 5 in May 2000, when the contaminants entered the system, substantially more than 99% of bacteria such as *E. coli* and *Campylobacter* would have been killed. For practical purposes, this would have prevented the outbreak.¹¹

In May 2000, the operators of the Walkerton system chlorinated the water at Well 5 but routinely used less than the required amount of chlorine at that well and at the others operated by the Walkerton PUC. The bacteria and other organic matter that entered the system on or shortly after May 12 overwhelmed the chlorine that was being added. The amount of contamination at the time was very likely so great that the demand it put on the chlorine would have overwhelmed even the amount of chlorine needed to maintain a residual of 0.5 mg/L under normal conditions.

As I point out above, the Walkerton operators did not manually monitor the chlorine residual levels at Well 5 during the critical period. Had they done so, it is very probable that the operators would have detected the fact that the chlorine residual had been overwhelmed, at which point they should have been

⁹ MOE, "Chlorination of Potable Water Supplies," Bulletin 65-W-4 (March 1987).

¹⁰ In this report, the terms "required residual" and "residual of 0.5 mg/L" should always be taken as including the qualifier "after 15 minutes of contact time."

¹¹ This statement is subject to the qualification that had a large increase in turbidity accompanied the contamination, that might have prevented the chlorine from eliminating the contaminants. In my view, it is most unlikely that this is what actually occurred.

able to take the proper steps to protect public health.¹² Although daily monitoring would not have prevented the outbreak, it is very probable that it would have significantly reduced the outbreak's scope. Instead, the contamination entered the system undetected.

Even more importantly, the outbreak would have been prevented by the use of continuous chlorine residual and turbidity monitors at Well 5.¹³ Walkerton did not have continuous chlorine residual and turbidity monitors at any of its wells in May 2000.

Well 5 was supplied by a groundwater source that was under the direct influence of surface water. For such sources, the Ontario Drinking Water Objectives (ODWO)¹⁴ require the continuous monitoring of chlorine residuals and turbidity.¹⁵ Had properly designed continuous monitors been in place at Well 5, the monitors would have automatically sounded an alarm so that the appropriate corrective action could have been taken to prevent contamination from entering the distribution system.

1.3.5 The Role of the Walkerton Public Utilities Commission Operators

Two serious failures on the part of the Walkerton PUC operators directly contributed to the outbreak in May 2000. The first was an operational problem: the failure to take chlorine residual measurements in the Walkerton water system daily. As I stated above, had the PUC operators manually tested the chlorine residual at Well 5 on May 13 or on the days following, as they should have done, they should have been able to take the necessary steps to protect the

¹² It would have been a relatively simple process for a competent water operator to interpret the implications of the lack of a chlorine residual, turn off the well, and alert the community to the problem.

¹³ An important purpose of installing continuous monitors is to prevent contamination from entering the distribution system. In reaching the conclusion that continuous monitors would have prevented the Walkerton outbreak, I am assuming that the MOE would have required that any such monitors be properly designed for the circumstances at Well 5. The monitors would thus have included an alarm as well as, in all probability, an automatic shut-off mechanism, because Well 5 was not staffed 24 hours a day and because the town had alternative water supplies – Wells 6 and 7.

¹⁴ Unless otherwise indicated, the term “ODWO” refers to the 1994 version of that document.

¹⁵ The requirement for turbidity monitoring was to take four samples a day or to install a continuous turbidity monitor. For ease of reference, I refer to this as “continuous turbidity monitoring.” As a practical matter, one would install a continuous monitor rather than take four samples a day.

community. It is very likely that daily testing of chlorine residuals would have significantly reduced the scope of the outbreak.

The second failure relates to the manner in which the PUC operators responded to the outbreak in May 2000. This failure is primarily attributable to Stan Koebel. When Mr. Koebel learned from test results for the samples collected on May 15 that there was a high level of contamination in the system, he did not disclose those results to the health unit staff who were investigating the illnesses in the community. On the contrary, starting on May 19, he actively misled health unit staff by assuring them that the water was safe. Had Stan Koebel been forthcoming about the adverse results or about the fact that Well 7 had operated for more than four days that week without a chlorinator, the health unit would have issued a boil water advisory on May 19 at the latest, and a minimum of 300 to 400 illnesses would probably have been prevented.

The two persons who were responsible for the actual operation of the water system were Stan and Frank Koebel. Stan Koebel had been the general manager of the PUC since 1988. In May 2000, he held a class 3 water operator's licence, which he had received through a grandparenting process. At the Inquiry, Stan Koebel accepted responsibility for his failures and apologized to the people of Walkerton. I believe he was sincere.

The evidence showed that under the supervision of Mr. Koebel, the Walkerton PUC engaged in a host of improper operating practices, including misstating the locations at which samples for microbiological testing were taken, operating wells without chlorination, making false entries in daily operating sheets, failing to measure chlorine residuals daily, failing to adequately chlorinate the water, and submitting false annual reports to the MOE. Mr. Koebel knew that these practices were improper and contrary to MOE guidelines and directives. There is no excuse for any of these practices.

Although Stan Koebel knew that these practices were improper and contrary to the directives of the MOE, he did not intentionally set out to put his fellow residents at risk. A number of factors help to explain, though not to excuse, the extraordinary manner in which the Walkerton PUC was operated under his direction. Many of the improper practices had been going on for years before he was general manager. Further, he and the other PUC employees believed that the untreated water in Walkerton was safe: indeed, they themselves often drank it at the well sites. On occasion, Mr. Koebel was pressured by local

residents to decrease the amount of chlorine injected into the water. Those residents objected to the taste of chlorinated water. Moreover, on various occasions, he received mixed messages from the MOE about the importance of several of its own requirements. Although Mr. Koebel knew how to operate the water system mechanically, he lacked a full appreciation of the health risks associated with a failure to properly operate the system and of the importance of following the MOE requirements for proper treatment and monitoring.

None of these factors, however, explain Stan Koebel's failure to report the test results from the May 15 samples to the health unit and others when asked about the water, particularly given that he knew of the illnesses in the community. It must have been clear to him that each of these questioners was unaware of those results. I am satisfied that he withheld information about the adverse results because he wanted to conceal the fact that Well 7 had been operated without chlorination for two extended periods in May 2000.¹⁶ He knew that doing so was wrong. He went so far as to have the daily operating sheet for Well 7 altered in order to mislead the MOE. In withholding information from the health unit, Mr. Koebel put the residents of Walkerton at greater risk. When he withheld the information, Mr. Koebel probably did not appreciate the seriousness of the health risks involved and did not understand that deaths could result. He did, however, know that people were becoming sick, and there is no excuse for his not having informed the health unit of the adverse results at the earliest opportunity.

Frank Koebel had been foreman of the PUC since 1988. He was the operator who, on May 13 and May 14, went to Well 5, failed to measure chlorine residuals, and made false entries in the daily operating sheet. As was the case with his brother, Frank Koebel also deeply regretted his role in these events.

Most of the comments I have made about Stan Koebel apply equally to Frank Koebel, with one exception: Frank Koebel was not involved in failing to disclose the May 15 results to the health unit. Yet on his brother's instructions, he did alter the daily operating sheet for Well 7 on May 22 or May 23 in an effort to conceal from the MOE the fact that Well 7 had operated without a chlorinator.

¹⁶ In addition to the period of May 15 to May 19 referred to above, Well 7 had also been operated without chlorination from May 3 to May 9.

As I point out above, the contamination of the system could have been prevented by the use of continuous monitors at Well 5. Stan and Frank Koebel lacked the training and expertise either to identify the vulnerability of Well 5 to surface contamination or to understand the resulting need for continuous chlorine residual and turbidity monitors. The MOE took no steps to inform them of the requirements for continuous monitoring or to require training that would have addressed that issue. It was the MOE, in its role as regulator and overseer of municipal water systems, that should have required the installation of continuous monitors. Its failure to require continuous monitors at Well 5 was not in any way related to the improper operating practices of the Walkerton operators. I will discuss this failure of the MOE below.

1.3.6 The Role of the Walkerton Public Utilities Commissioners

The Walkerton PUC commissioners were responsible for establishing and controlling the policies under which the PUC operated. The general manager and staff were responsible for administering these policies in operating the water facility. The commissioners were not aware of the operators' improper chlorination and monitoring practices. Also, while Well 5's vulnerability had been noted when it was approved in the late 1970s, those who served as commissioners in the decade leading up to the tragedy were unaware of Well 5's clear and continuing vulnerability to contamination and the resulting need for continuous monitors.

The evidence showed that the commissioners concerned themselves primarily with the financial side of the PUC's operations and had very little knowledge about matters relating to water safety and the operation of the system. Inappropriately, they relied almost totally on Stan Koebel in these areas.

In May 1998, the commissioners received a copy of an MOE inspection report that indicated serious problems with the manner in which the Walkerton water system was being operated. The report stated that *E. coli*, an indicator of unsafe drinking water quality, had been present in a significant number of treated water samples. Among other things, the report emphasized the need to maintain an adequate chlorine residual. It also pointed out other problems: the PUC had only recently begun to measure chlorine residuals in the distribution system, was not complying with the minimum bacteriological sampling requirements, and was not maintaining proper training records.

In response, the commissioners did nothing. They did not ask for an explanation from Mr. Koebel: rather, they accepted his word that he would correct the deficient practices, and they never followed up to ensure that he did. As it turns out, Mr. Koebel did not maintain adequate chlorine residuals, as he had said he would, and did not monitor residuals as often as would have been necessary to ensure their adequacy. In my view, it was reasonable to expect the commissioners to have done more.

The commissioners should have had enough knowledge to ask the appropriate questions and to follow up on the answers that were given. However, if they did not feel qualified to address these issues, they could have contracted with an independent consultant to help them evaluate the manner in which Stan Koebel was operating the system and to assure themselves that the serious concerns about water safety raised in the report were addressed.

Without excusing the role played by the commissioners, it is important to note that, like Stan and Frank Koebel, they did not intend to put the residents of Walkerton at risk. They believed that the water was safe. They were distraught about the events of May 2000. Moreover, it appears from PUC records that they performed their duties in much the same way as their predecessors had. That approach seems to have been inherent in the culture at the Walkerton PUC.

Even if the commissioners had properly fulfilled their roles, it is not clear that Mr. Koebel would have changed the PUC's improper practices. However, it is possible that he would have brought the chlorination and monitoring practices into line, in which case it is very probable that the scope of the outbreak in May 2000 would have been significantly reduced. Thus, the failure of those who were commissioners in 1998 to properly respond to the MOE inspection report represented a lost opportunity to reduce the scope of the outbreak.

1.3.7 The Role of the Municipality¹⁷ and the Mayor

The municipality's role was limited, given that at the relevant times the water system was operated by a public utilities commission. I focus on three occasions following which, it has been suggested, the municipality should have

¹⁷ Before the amalgamation that resulted in the formation of the Municipality of Brockton on January 1, 1999, the relevant authority was the Town of Walkerton.

taken steps to protect drinking water or the community's health but did not do so: a November 1978 meeting at which MOE representatives suggested land use controls for the area surrounding Well 5; the receipt of the 1998 MOE inspection report; and the issuance of the boil water advisory in the early afternoon of May 21, 2000.

I conclude that the Town of Walkerton did not have the legal means to control land use in the vicinity of Well 5. Further, at the 1978 meeting, the discussion about controlling land use revolved primarily around the former Pletsch farm. In fact, however, the bacterial contamination of the Walkerton water system originated elsewhere.

Given that the control and management of the waterworks were vested in the Walkerton PUC, the Walkerton town council's response to the 1998 inspection report was not unreasonable. The council was entitled to rely on the PUC commissioners to follow up on the deficiencies identified in the report.

Brockton's mayor, David Thomson, was in an ideal position to assist the local health unit in disseminating the boil water advisory on May 21 and May 22. But Dr. Murray McQuigge did not request any assistance. Even though the mayor knew that the people of Walkerton were becoming ill, he did not offer to help inform them about the boil water advisory. Although others in his position might have done so, I conclude that the mayor should not be faulted for having failed to offer assistance.

Further, I conclude that it was not unreasonable for Mayor Thomson and other members of Brockton's municipal council to refrain from invoking the Brockton Emergency Plan. Due consideration was given to taking this extraordinary step. The primary benefit of invoking the plan would have been to assist in publicizing the boil water advisory. By the time the municipal council was considering whether the plan should be invoked, the existence of the boil water advisory was already well known within the community.

1.3.8 The Role of the Public Health Authorities

I consider the role of the Bruce-Grey-Owen Sound Health Unit in relation to the events in Walkerton in three separate contexts: its role in overseeing the quality of the drinking water in Walkerton over the years leading up to

May 2000, its reaction to the privatization of laboratory testing services in 1996, and its response to the outbreak in May 2000.

In the normal course of events, the health unit exercised its oversight role by receiving notice of reports of adverse water quality and MOE inspection reports, and responding to such reports when it considered a response to be necessary. It would have been preferable for the health unit to have taken a more active role in responding to the many adverse water quality reports it received from Walkerton between 1995 and 1998 and to the 1998 MOE inspection report. During the mid- to late 1990s, there were clear indications that the water quality in Walkerton was deteriorating.

On receiving adverse water quality reports, the local public health inspector in Walkerton would normally contact the Walkerton PUC to ensure that follow-up samples were taken and chlorine residuals maintained. Instead, when he received the 1998 MOE inspection report, he read and filed it, assuming that the MOE would ensure that the problems identified were properly addressed. Given that there was no written protocol instructing the local public health inspector on how to respond to adverse water reports or inspection reports, I am satisfied that he did all that was expected of him.¹⁸

Even if the health unit had responded more actively when concerns arose about the water quality in Walkerton in the mid- to late 1990s, it is unlikely that such responses would have had any impact on the events of May 2000. The actions required to address the concerns were essentially operational. The MOE was the government regulator responsible for overseeing Walkerton's water system. After the 1998 inspection report, it directed the PUC to remedy a number of operational deficiencies, but then failed to follow up to ensure that the proper steps were taken. I am satisfied that it was appropriate for the health unit to rely on the MOE to oversee operations at the Walkerton PUC and to follow up on the 1998 inspection report.

After laboratory testing services for municipalities were assumed by the private sector in 1996, the health unit sought assurance from the MOE's Owen Sound office that the health unit would continue to be notified of all adverse water

¹⁸ It would have been preferable for the Ministry of Health and the health unit to have provided clear direction to health unit staff on how to respond to adverse water quality reports and MOE inspection reports. I will be making recommendations in the Part 2 report of this Inquiry to clarify the respective roles of local health units and the MOE in overseeing municipal water systems.

quality results relating to communal water systems. It received that assurance, both in correspondence and at a meeting. I am satisfied that the health unit did what was reasonable in reacting to the privatization of laboratory services.

The health unit was first notified of the outbreak in Walkerton on Friday, May 19, 2000. It issued a boil water advisory two days later. In the interval, health unit staff investigated the outbreak diligently. There were several reasons why the health unit did not immediately conclude that the water was the problem. Initially, a food-borne source was the prime suspect. However, because water was a possible source of the problem, the health unit staff contacted Stan Koebel twice on May 19 and twice again on May 20. Each time they were given information that led them to believe the water was safe. The health unit had no reason not to accept what Stan Koebel told them. His assurances pointed the health unit staff away from water as the source of the problem.

Moreover, the symptoms being reported were consistent with *E. coli* O157:H7. Infection with *E. coli* O157:H7 is most commonly associated with food, not water – indeed, it is often referred to as “the hamburger disease.” The health unit was not aware of any reported *E. coli* outbreak that had been linked to a treated water system in North America. Further, illnesses were surfacing in communities outside Walkerton, a pattern that tended to indicate a source that was not water-borne.

In my view, the health unit should not be faulted for failing to issue the boil water advisory before May 21. I recognize that others in the community suspected there was something wrong with the water and took steps to avoid infection. They are to be commended for their actions. However, issuing a boil water advisory is a significant step requiring a careful balancing of a number of factors. Precaution and the protection of public health must always be paramount, but unwarranted boil water advisories have social and economic consequences and, importantly, have the potential to undermine the future credibility of the health unit issuing such an advisory. In revisiting the exercise of judgment by professionals like the health unit staff, one must be careful about the use of hindsight. In view of the assurances provided by Mr. Koebel about the safety of the water, I am satisfied that the health unit was appropriately prudent and balanced in the way in which it investigated the outbreak and decided to issue the boil water advisory.

In this respect, I do not think that the failure of the health unit to review its Walkerton water file between May 19 and May 21 made any difference to the time at which the boil water advisory was issued. The most recent relevant evidence of water quality problems in the file was more than two years old. I accept the evidence of Dr. McQuigge and others that in May 2000, more timely information was needed about Walkerton's water. The health unit sought that information and was assured by Stan Koebel that all was well.

The health unit disseminated the boil water advisory to the community by having it broadcast on local AM and FM radio stations. It also contacted several public institutions directly. Evidence showed that some local residents did not become aware of the boil water advisory on May 21. In his evidence, Dr. McQuigge acknowledged that if he faced a similar situation again, he would use local TV stations and have pamphlets distributed informing residents of the boil water advisory. That would have been a better approach, because the boil water advisory should have been more broadly publicized.

1.3.9 The Role of the Ministry of the Environment

The Ministry of the Environment (MOE) was and continues to be the provincial government ministry with primary responsibility for regulating – and for enforcing legislation, regulations, and policies that apply to – the construction and operation of municipal water systems.¹⁹ In this regard, the MOE sets the standards according to which municipal systems are built and operated. It also approves the construction of new water facilities, certifies water plant operators, and oversees the treatment, distribution, and monitoring practices of municipal water facilities. The overall goal is to ensure that water systems are built and operated in a way that produces safe water and does not threaten public health.

As pointed out above, there were two serious problems with the manner in which the Walkerton water system was operated that contributed to the tragedy in May 2000. The first was the failure to install continuous chlorine residual and turbidity monitors at Well 5. The failure to use continuous monitors at Well 5 resulted from shortcomings of the MOE in fulfilling its regulatory and

¹⁹ I refer to “municipal water systems” frequently throughout this report. For readability, I use the term interchangeably with “municipal waterworks,” “municipal water facilities,” “communal water systems,” and similar terms.

oversight role. The PUC operators did not have the training or expertise either to identify the vulnerability of Well 5 to surface contamination or to understand the resulting need for continuous monitors. It would be unreasonable for the MOE to expect that all operators of small water systems like Walkerton's would have the expertise necessary either to identify water sources that are vulnerable to contamination or to understand the need to install continuous chlorine residual and turbidity monitors where such vulnerability exists. Continuous monitors at Well 5 could have prevented the outbreak. It is simply wrong to say, as the government argued at the Inquiry, that Stan Koebel or the Walkerton PUC were solely responsible for the outbreak or that they were the only ones who could have prevented it.

The second problem with the operation of the Walkerton's water system was the improper chlorination and monitoring practices of the PUC. I have discussed those above. Without in any way excusing the PUC operators for the manner in which they disregarded MOE requirements and directives, I am satisfied that the MOE should have detected those practices and ensured that they were corrected. Had the MOE done so, the scope of the outbreak would probably have been significantly reduced.

I have concluded that a number of MOE programs or policies²⁰ involved in the regulation and oversight of the Walkerton water system were deficient – some more so than others. The MOE's "deficiencies" all fall into the category of omissions or failures to take appropriate action, rather than positive acts. As a result, the effects of those deficiencies on the events in Walkerton must be measured by their failure to address one or both of the two problems at Walkerton referred to above. In that sense, the deficiencies can be measured by their failure to prevent the outbreak, to reduce its scope, or to reduce the risk that the outbreak would occur. Viewed in this light, some of the deficiencies are more closely connected to the tragedy than are others.

Responsibility for the MOE's deficiencies rests at different levels of the ministry. Walkerton fell within the jurisdiction of the MOE's Owen Sound office. Some of the deficiencies with government programs that I identify affected Walkerton through the activities of the Owen Sound office. Some also arose from the activities of the MOE's central offices in Toronto.

²⁰ According to the mandate, I am to report on "the effect, if any, of government policies, procedures and practices." This phrase is obviously intended to include government programs. Throughout this report, I use the terms "policies" and "programs," depending on the context, to refer to this part of the mandate.

I have chosen to discuss issues relating to the privatization of laboratory testing services and budget reductions in separate chapters because those issues involve decisions made by the Cabinet, not just by the MOE.

The most significant deficiencies associated with the MOE relate to the approvals program, the inspections program, the preference for voluntary rather than mandatory abatement, and the water operator certification and training program. I will briefly describe the main deficiencies I have identified.

1.3.9.1 *The Approvals Program*

Well 5 was constructed in 1978, and the Certificate of Approval for the well was issued in 1979. However, no operating conditions were attached to the Certificate of Approval. From the outset, Well 5 was identified as a potential problem: the groundwater supplying the well was recognized as being vulnerable to surface contamination. The approval of the well without imposing explicit operating conditions was consistent with the MOE's practices at that time.

Over time, MOE practices changed and it began to routinely attach operating conditions to Certificates of Approval, including conditions relating to water treatment and monitoring. By 1992, the MOE had developed a set of model operating conditions that were commonly attached to new Certificates of Approval for municipal water systems. There was, however, no effort to reach back to determine whether conditions should be attached to existing certificates, like the one for Well 5.

The ODWO was amended in 1994 to provide that water supply systems using groundwater that is under the direct influence of surface water should continuously monitor "disinfectant residuals (equivalent to free chlorine)" – a type of chlorine residual – and turbidity. Even at that point there was no program or policy to examine the water sources supplying wells referred to in existing Certificates of Approvals to determine whether a condition should be added requiring continuous monitoring. Well 5 used groundwater that was under the direct influence of surface water, and the MOE should therefore have required the installation of continuous monitors at that well following the 1994 ODWO amendment.

The MOE never did add any conditions to the Certificate of Approval for Well 5. I am satisfied that a properly structured approvals program would have addressed the need to update the Certificate of Approval for Well 5, both after the 1994 amendment to the ODWO and when the MOE practices for newly issued certificates changed in the 1990s. The installation of continuous chlorine residual and turbidity monitors at Well 5 would have prevented the Walkerton tragedy. It is very probable that the inclusion of the model operating conditions relating to the maintenance of a total chlorine residual of 0.5 mg/L after 15 minutes of contact time, coupled with effective enforcement, would have significantly reduced the scope of the outbreak.

1.3.9.2 *The Inspections Program*

The MOE inspected the Walkerton water system in 1991, 1995, and 1998. At the time of the three inspections, problems existed relating to water safety. Inspectors identified some of them, but unfortunately two of the most significant problems – the vulnerability of Well 5 to surface contamination, and the improper chlorination and monitoring practices of the PUC – went undetected. As events turned out, these problems had a direct impact on the May 2000 tragedy.

In the course of the inspections, Well 5 was not assessed, and therefore was not identified as a groundwater source that was under the direct influence of surface water. The inspectors proceeded as if Well 5 were a secure groundwater source, and their reports made no reference to the surface water influence. This occurred even though information that should have prompted a close examination of the vulnerability of Well 5 was available in MOE files. In my view, the inspections program was deficient in that the inspectors were not directed to look at relevant information about the security of water sources.

The second problem not addressed in the three inspection reports was the improper chlorination and monitoring practices of the PUC, discussed above. The evidence of these practices was there to be seen in the operating records maintained by the PUC. A proper examination of the daily operating sheets would have disclosed the problem. However, the inspections program was deficient in that the inspectors were not instructed to carry out a thorough review of operating records.

Although the MOE was not aware of the Walkerton PUC's improper chlorination and monitoring practices, I am satisfied that if the ministry had properly followed up on the operational problems identified in the 1998 inspection report, the unacceptable treatment and monitoring practices would have (or at least should have) been discovered. Specifically, *E. coli* was being detected in the treated water with increasing frequency and three successive inspections had measured chlorine residuals in treated water at less than the required 0.5 mg/L. Moreover, the Walkerton PUC had repeatedly failed to submit the required number of samples for microbiological testing. All of this should have led the MOE to conduct a follow-up inspection after 1998, preferably an unannounced inspection. However, two years and three months later, when the tragedy struck, no further inspection had even been scheduled.

I am satisfied that a properly structured and administered inspections program would have discovered, before the May 2000 outbreak, both the vulnerability of Well 5 and the PUC's unacceptable chlorination and monitoring practices. Had these problems been uncovered, steps could have been taken to address them, and thus to either prevent the outbreak or substantially reduce its scope.

1.3.9.3 *Voluntary and Mandatory Abatement*

In the years preceding May 2000, the MOE became aware on several occasions that the Walkerton PUC was not conforming with the ministry's minimum microbiological sampling program and that it was not maintaining a minimum total chlorine residual of 0.5 mg/L. Despite repeated assurances that it would conform with the MOE's requirements, the PUC failed to do so. These ongoing failures indicated a poorly operated water facility. The MOE took no action to legally enforce the treatment and monitoring requirements that were being ignored. Instead, it relied on a voluntary approach to abatement. This was consistent with the culture in the MOE at the time.

After its inspection of Walkerton's water system in 1998, the MOE should have issued a Director's Order to compel the Walkerton PUC to comply with the requirements for treatment and monitoring. It is possible that if the MOE had issued such an order in 1998, the PUC would have responded properly, taken the treatment and monitoring requirements more seriously, and brought its practices into line. If, however, the PUC had continued to ignore the newly mandated requirements, it seems likely that with proper follow-up the MOE would have discovered that the PUC was not in compliance and would have

been in a position to ensure that the appropriate corrective actions were taken. As I have said, proper chlorination and monitoring would have made a difference in May 2000.

1.3.9.4 *Operator Certification and Training*

Stan and Frank Koebel had extensive experience in operating the Walkerton water system, but they lacked knowledge in two very important areas. They did not appreciate either the seriousness of the health risks arising from contaminated drinking water or the seriousness of their failure to treat and monitor the water properly. They mistakenly believed that the untreated water supplying the Walkerton wells was safe.

Managing a municipal water system involves enormous responsibility. Competent management entails knowing more than how to operate the system mechanically or what to do under normal circumstances. Competence must also include an appreciation of the nature of the risks to water safety and an understanding of how protective measures, like chlorination and chlorine residual and turbidity monitoring, work to protect water safety. Stan and Frank Koebel did not have this knowledge. In that sense, they were not qualified to hold their respective positions with the Walkerton PUC.

Stan and Frank Koebel were certified as class 3 water operators at the time of the outbreak. They had obtained their certification through a “grandparenting” scheme based solely on their experience. They were not required to take a training course or to pass any examinations in order to be certified. Nonetheless, I conclude that at the time when mandatory certification was introduced, it was not unreasonable for the government to make use of grandparenting, provided that adequate mandatory training requirements existed for grandparented operators.

After the introduction of mandatory certification in 1993, the MOE required 40 hours of training a year for each certified operator. Stan and Frank Koebel did not take the required amount of training, and the training they did take did not adequately address drinking water safety. I am satisfied that the 40-hour requirement should have been more focused on drinking water safety issues and, in the case of Walkerton, more strictly enforced.

It is difficult to say whether Stan and Frank Koebel would have altered their improper practices if they had received appropriate training. However, I can say that proper training would have reduced the likelihood that they would have continued their improper practices.

1.3.9.5 *Other Deficiencies*

The deficiencies I have described above are the most significant in terms of the effect of MOE policies on the tragedy in Walkerton. However, there were other shortcomings in MOE policies and programs that are relevant to the events in Walkerton. These inadequacies arose in the MOE's management of information, the training of its personnel, and the use of guidelines rather than legally binding regulations to set out the requirements for chlorination and monitoring. I summarize these deficiencies in this section.

The MOE did not have an information system that made critical information about the history of vulnerable water sources, like Well 5, accessible to those responsible for ensuring that proper treatment and monitoring were taking place. On several occasions in the 1990s, having had access to this information would have enabled ministry personnel to be fully informed in making decisions about current circumstances and the proper actions to be taken.

By the mid-1990s, when the water quality at Walkerton began to show signs of deterioration, certain important documents were no longer readily accessible to those who were responsible for overseeing the Walkerton water facility. Indirectly, at least, the lack of a proper information system contributed to the failures of the MOE referred to above.

With respect to training, evidence at the Inquiry showed that personnel in the MOE's Owen Sound office were unaware of certain matters that were essential to carrying out their responsibilities in overseeing the Walkerton water facility. In particular, several environmental officers were unaware that *E. coli* was potentially lethal. It would seem critical that those who are responsible for overseeing municipal water systems, and who might have to coordinate responses to adverse water results, should fully appreciate the potential consequences of threats to water safety.

The effect of this lack of training on what happened in Walkerton in May 2000 is difficult to measure, but it may have had an impact on some

decisions affecting Walkerton relating to the inspections and abatement programs.

In the exercise of its regulatory and oversight responsibilities for municipal water systems, the MOE developed and regularly applied two sets of guidelines or policies: the ODWO and the Chlorination Bulletin. I am satisfied that matters as important to water safety and public health as those set out in these guidelines should instead have been covered by regulations – which, unlike guidelines, are legally binding. Two possible effects on Walkerton arose from the use of guidelines rather than regulations. Stan and Frank Koebel, despite their belief that the untreated water at Walkerton was safe, would no doubt have been less comfortable ignoring a legally binding regulation than ignoring a guideline.

Moreover, the use of guidelines may have affected the MOE's failure to invoke mandatory abatement measures and to conduct a follow-up to the 1998 inspection. Had the Walkerton PUC been found to be in non-compliance with a legally enforceable regulation, as opposed to a guideline, it is more likely that the MOE would have taken stronger measures to ensure compliance – such as the use of further inspections, the issuance of a Director's Order, or enforcement proceedings.

I note, however, that prior to the events in Walkerton there was no initiative, either from within or outside the MOE, to include these guidelines' requirements for treatment and monitoring in legally enforceable regulations.

1.3.9.6 Summary

I am satisfied that if the MOE had adequately fulfilled its regulatory and oversight role, the tragedy in Walkerton would have been prevented (by the installation of continuous monitors) or at least significantly reduced in scope.

It is worth observing that since the Walkerton tragedy, the government has recognized that improvements were needed in virtually all of the areas where I identify deficiencies and has taken steps to strengthen the MOE's regulatory or oversight role. In my view, though, more changes are required. I make some specific recommendations regarding the MOE's role in this report, and I will make extensive recommendations about the regulation and oversight of water systems in the Part 2 report of this Inquiry.

1.3.10 The Failure to Enact a Notification Regulation

At the time of the Walkerton outbreak, the government did not have a legally enforceable requirement²¹ for the prompt and direct reporting of adverse results from drinking water tests to the MOE and to local Medical Officers of Health. This contributed to the extent of the outbreak in Walkerton in May 2000.

For years, the government had recognized that the proper reporting of adverse test results is important to public health. The ODWO directs testing laboratories to report any indicators of unsafe water quality to the local MOE office, which in turn is directed to notify²² the local Medical Officer of Health. The Medical Officer of Health then decides whether to issue a boil water advisory.

When government laboratories conducted all of the routine drinking water tests for municipal water systems throughout the province, it was acceptable to keep the notification protocol in the form of a guideline under the ODWO rather than in a legally enforceable form – that is, a law or regulation. However, the entry of private laboratories into this sensitive public health area in 1993, and the wholesale exit of all government laboratories from routine testing of municipal water samples in 1996, made it unacceptable to let the notification protocol remain in the form of a legally unenforceable guideline.

This was particularly so since at the time, private environmental laboratories were not regulated by the government. No criteria had been established to govern the quality of testing, no requirements existed regarding the qualifications or experience of laboratory personnel, and no provisions were made for the licensing, inspection, or auditing of such laboratories by the government.

Starting in 1993, a small number of municipalities began to use private laboratories for microbiological testing. In 1996, however, as part of the government's program of budget reductions, the government stopped

²¹ Although in this section I refer to such requirements as “regulations,” I note that the government could also have passed a statute instead of a regulation.

²² The terms “notify” and “report” are used interchangeably in the documents, the evidence, and this report.

conducting any routine drinking water tests for municipalities – that is, it fully privatized laboratory testing.²³

At the time, the government was aware of the importance of requiring testing laboratories to directly notify the MOE and the local Medical Officer of Health about adverse test results. At the time of privatization in 1996, the MOE sent a guidance document to those municipalities that requested it. The document strongly recommended that a municipality include in any contract with a private laboratory a clause specifying that the laboratory notify the MOE and the local Medical Officer of Health directly of adverse test results. There is no evidence that the Walkerton PUC either requested or received this document.

Before 1996, the government was aware of cases in which local Medical Officers of Health had not been notified of adverse test results from municipal water systems. After privatization in 1996, the government did not implement a program to monitor the effect of privatization on the notification procedures followed whenever adverse results were found. When the MOE became aware that some private sector laboratories were not notifying the ministry about adverse results as specified in the ODWO, its response was piecemeal and unsatisfactory. Importantly, senior MOE management did not alert the local MOE offices that they should monitor and follow up on the notification issue.

In 1997, the Minister of Health took the unusual step of writing to the Minister of the Environment to request that legislation be amended, or assurances be given, to ensure that the proper authorities would be notified of adverse results. The Minister of the Environment declined to propose legislation, indicating that the ODWO dealt with this issue. He invited the Minister of Health to address the matter through the Drinking Water Coordination Committee, which included staff from both of their ministries. Nothing else happened until after the tragedy in Walkerton. Only then did the government enact a regulation requiring laboratories to directly notify the MOE and the local Medical Officer of Health about adverse test results.

²³ I use the term “privatization” throughout this section. This term is used extensively in the evidence, in many documents, and in the submissions of the parties. In the context of this Inquiry, the term refers to the government’s 1996 discontinuation of all routine microbiological testing for municipal water systems – a move that resulted in the large majority of municipal systems turning to private sector laboratories for routine water testing. Municipalities are not required to use private laboratories: a few larger municipalities operate their own. Practically speaking, however, the large majority have no option other than to use private laboratories.

I am satisfied that the regulatory culture created by the government through the Red Tape Commission review process discouraged any proposals to make the notification protocol for adverse drinking water results legally binding on the operators of municipal water systems and private laboratories. On several occasions, concerns were expressed by officials in the Ministry of Health, as well as in the MOE, regarding failures to report adverse water results to local Medical Officers of Health in accordance with the ODWO protocol. Despite these concerns, the government did not enact a regulation to make notification mandatory until after the Walkerton tragedy. The evidence showed that the concept of a notification regulation would likely have been “a non-starter,” given the government’s focus on minimizing regulation.

The laboratory used by Walkerton in May 2000, A&L Canada Laboratories, was unaware of the notification protocol outlined in the ODWO. A&L notified the Walkerton PUC, but not the MOE or the local Medical Officer of Health, of the critical adverse results from the May 15 samples. Both the fact that this was an unregulated sector and the fact that the ODWO was a guideline, not a regulation, help explain why A&L was unaware of the protocol.

In my view, it was not reasonable for the government, after the privatization of water testing, to rely on the ODWO – a guideline – to ensure that laboratories would notify public health and environmental authorities directly of adverse results. The government should have enacted a regulation in 1996 to mandate direct reporting by testing laboratories of adverse test results to the MOE and to local Medical Officers of Health. Instead, it enacted such a regulation only after the Walkerton tragedy.

If, in May 2000, the notification protocol had been contained in a legally enforceable regulation applicable to private sector laboratories, I am satisfied that A&L would have informed itself of the protocol and complied with it. The failure of A&L to notify the MOE and the local Medical Officer of Health about the adverse results from the May 15 samples was the result of the government’s failure to enact a notification regulation. Had the local Medical Officer of Health been notified of the adverse test results on May 17, as he should have been, he would have issued a boil water advisory before May 21 – by May 19 at the latest. An advisory issued on May 19 would very likely have

prevented the illnesses of at least 300 to 400 people, although it is unlikely that any of the deaths would have been avoided.²⁴

1.3.11 Budget Reductions

The budget reductions had two types of impact on Walkerton. The first stemmed from the decision to cut costs by privatizing laboratory testing of water samples in 1996 and, in particular, the way in which that decision was implemented. As discussed above, the government's failure to enact a regulation to legally require testing laboratories to promptly report test results indicating unsafe drinking water directly to the MOE and the local Medical Officer of Health contributed to the extent of the May 2000 Walkerton outbreak.

The second impact on Walkerton of the budget reductions relates to the MOE approvals and inspections programs. The budget reductions that began in 1996 made it less likely that the MOE would pursue proactive measures that would have identified the need for continuous monitors at Well 5 or would have detected the Walkerton PUC's improper chlorination and monitoring practices – steps that would, respectively, have prevented the outbreak or reduced its scope.

The MOE's budget had already been reduced between 1992 and 1995. After the new government was elected in 1995, however, the MOE's budget underwent substantial further reductions. By 1998–99, the ministry's budget had been reduced by more than \$200 million – resulting, among other effects, in its staff complement being cut by more than 750 employees (a reduction of over 30%). The reductions were initiated by the central agencies of the government,²⁵ rather than from within the MOE, and they were not based on an assessment of what was required to carry out the MOE's statutory responsibilities.

Before the decision was made to significantly reduce the MOE's budget in 1996, senior government officials, ministers, and the Cabinet received numerous warnings that the impacts could result in increased risks to the environment

²⁴ If the boil water advisory had been issued on May 18, approximately 400 to 500 illnesses would have been avoided. It is possible that one death might have been prevented.

²⁵ The "central agencies" include the Management Board Secretariat, the Ministry of Finance, the Cabinet Office, and the Premier's Office.

and human health. These risks included those resulting from reducing the number of proactive inspections – risks that turned out to be relevant to the events in Walkerton. The decision to proceed with the budget reductions was taken without either an assessment of the risks or the preparation of a risk management plan. There is evidence that those at the most senior levels of government who were responsible for the decision considered the risks to be manageable. But there is no evidence that the specific risks, including the risks arising from the fact that the notification protocol was a guideline rather than a regulation, were properly assessed or addressed.

In February 1996, the Cabinet approved the budget reductions in the face of the warnings of increased risk to the environment and human health.

1.3.12 Other Government Programs

The Inquiry heard evidence about a number of other government programs or policies that I conclude did not have an effect on the events in Walkerton. However, I consider it useful to briefly set out the nature of some of this evidence and the reasons for my conclusions. I do so in Chapter 12 of this report.

1.4 The Scope of the Mandate

An Order-in-Council sets out the mandate for this Inquiry. Those parts of the mandate that relate to the events in Walkerton are as follows:

2. The commission shall inquire into the following matters:
 - (a) the circumstances which caused hundreds of people in the Walkerton area to become ill, and several of them to die in May and June 2000, at or around the same time as *Escherichia coli* bacteria were found to be present in the town's water supply;
 - (b) the cause of these events including the effect, if any, of government policies, procedures and practices;

....

[i]n order to make such findings and recommendations as the commission considers advisable to ensure the safety of the water supply system in Ontario.

I am satisfied that the mandate should be interpreted broadly in order to fully reflect the purpose for which the Inquiry was called. Like many public inquiries, this Inquiry was called in the aftermath of a tragedy. The public was shocked by what had happened in Walkerton. People had assumed that treated drinking water was safe. There were questions from every quarter about how this happened, how it could have been prevented, what role public officials played, and what had happened to the government programs that were intended to prevent such tragedies from occurring.

The public's interest and concern are fundamental to the purpose for which the Inquiry was called. This Inquiry is intended to address all of the legitimate questions about what happened in Walkerton and why. The mandate should not be interpreted in a manner that leaves any of those questions unanswered.

Paragraph 2(b) of the Order-in-Council directs me to report on "the cause" of the tragedy, including "the effect, if any, of government policies, procedures and practices." I am satisfied that the term "cause" should not be interpreted in the same manner that is used in determining issues related to civil or criminal liability. This Inquiry has a different purpose from that of either civil or criminal proceedings.²⁶ The purpose of the Inquiry is not to make findings of liability or responsibility in a legal sense, but rather to report on all the circumstances surrounding the events in Walkerton and all the causes of those events so as to help ensure the safety of drinking water in the future. Understanding what went wrong in Walkerton should, in itself, prove helpful in the future to those responsible for regulating, managing, and operating water systems.

I am satisfied that I should report not only on acts or events that directly "caused" the outbreak in a positive sense, but also on those failures or omissions that did not prevent the outbreak, reduce its scope, or reduce the risk that the outbreak would occur. By way of example, I note that many government policies or programs are intended to reduce the risk that drinking water will be unsafe.

²⁶ I note that paragraph 3 of the Order-in-Council specifically precludes me from making findings of civil or criminal liability. It reads as follows: "The commission shall perform its duties without expressing any conclusion or recommendation regarding the civil or criminal liability of any person or organization. The commission, in the conduct of its inquiry, shall ensure that it does not interfere with any ongoing criminal investigation or criminal proceedings, if any, relating to these matters."

Given the language of paragraph 2(b) of the Order-in-Council, I have no doubt that the mandate directs me to report on the failures of any of these policies or programs to achieve their intended purposes. Likewise, I should also report on the failures of others to take steps that would have reduced the risk that the Walkerton tragedy would occur.

For the purposes of calling evidence, I asked my counsel to err on the side of inclusion. If matters were possibly relevant to the mandate, the evidence was to be called. However, the fact that evidence was called about a particular matter does not in itself mean that there is a connection to the events of May 2000. In determining what matters warrant comment or assessment in this report, I have attempted to take a common sense approach and to be guided by what the public might reasonably expect, based on the evidence at the Inquiry. I am careful not to draw conclusions about matters that are so removed from the events in Walkerton that a connection between those matters and the tragedy would be based on little more than speculation.

I want to make three points about the manner in which I have expressed certain conclusions. Because this is not, strictly speaking, a legal proceeding, in certain cases I have not made “findings of fact” based either on a balance of probability (the civil test) or on proof beyond a reasonable doubt (the criminal test). Instead of making findings of fact, in some instances I have set out my conclusions by expressing them in terms of the probability or likelihood of something happening or not happening. In some cases I increase the certainty of my conclusion by using the qualifier “very.” For readability, I use the words “probable” and “likely” interchangeably. One should not read a different meaning into the use of the two different words in similar contexts.

Several of my conclusions are qualified by rather remote possibilities. For the sake of the reader, I do not repeat qualifications that fall into the “possible but unlikely” category in all instances. This is particularly true in sections 1.2 and 1.3 above, but it occurs in the body of the report as well. I have, however, set out my qualifications very precisely whenever I first reach a conclusion in the body of the report.

Finally, throughout the report, I occasionally use terms such as “fault,” “responsible,” and “accountable,” which could have a legal connotation. I do not intend, in this report, to reach any conclusions in law. Readers should attach the normal, non-legal meaning to words of this nature.

1.5 Recommendations

A purpose of the Inquiry is to inquire into and report on what happened and the causes of the tragedy, including how it might have been prevented. I do not interpret the mandate as narrowly limiting my findings and conclusions to only those that trigger recommendations. Knowing what happened in Walkerton will assist in a general sense in ensuring the future safety of drinking water in Ontario.

In the Part 2 report of this Inquiry, I will be making comprehensive recommendations relating to all aspects of the drinking water system in Ontario, including the protection of drinking water sources; the treatment, distribution, and monitoring of drinking water; the operation and management of water systems; and the full range of functions involved in the provincial regulatory role. Here in the Part 1 report, however, I do include some recommendations – those that relate to the findings I reach in this report. The recommendations included in this report are not intended to be comprehensive. They will fit into and form part of the broader framework being recommended in the Part 2 report.

1.6 The Role of the Coroner

The role of the Chief Coroner of Ontario, Dr. James Young, particularly in Part 1 of the Inquiry, deserves special mention. The Chief Coroner and I met early in the process to discuss issues arising from the potential overlap between the Inquiry and a coroner's inquest, in case he should decide to call one. We agreed that it would be helpful and appropriate for the Chief Coroner to participate in the Inquiry by applying for standing, and the Chief Coroner was granted standing in both parts of the Inquiry. His counsel attended all of the hearings in Part 1 and made an excellent contribution, both through cross-examination and in closing submissions. My own understanding benefited greatly from this contribution.

In addition, the Chief Coroner initiated an investigation in the immediate aftermath of the outbreak. Dr. Karen Acheson, regional coroner for the Walkerton area,²⁷ was called to testify about that investigation at the Inquiry.

²⁷ Dr. Karen Acheson is the regional coroner for South Georgian Bay, which includes Bruce County, where Walkerton is located.

Further, the Chief Coroner arranged for a panel of experts in epidemiology, microbiology, and the clinical treatment of hemolytic uremic syndrome to determine which deaths in Walkerton, if any, were associated with the outbreak. This panel was also called to testify at the Inquiry, and its findings were received as expert evidence.

In closing submissions, the Chief Coroner, through his counsel, provided an extensive analysis of the evidence called in Part 1 of the Inquiry. In addition, he included a very helpful list of suggested recommendations directed at ensuring the future safety of Ontario's drinking water. In this report, I have adopted many of the recommendations suggested by the Chief Coroner. In the Part 2 report of this Inquiry, I will be addressing and including many more.

At the outset, I agreed with the Chief Coroner that I would discuss with him the substance of the conclusions I have reached in this report. I have done so, in very general terms. In this regard, I followed a process similar to that followed by the Commission of Inquiry into the Air Ontario Crash at Dryden, Ontario. I should note that the Chief Coroner's investigation of the deaths in Walkerton continues: he has delayed his decision regarding whether to call an inquest until after the release of my report.

Finally, I wish to express my sincere appreciation to the Chief Coroner, his staff, and his counsel for the assistance and cooperation they have provided throughout the Inquiry.

