August 9, 2001

# INTEGRATED FINAL ARGUMENT – WALKERTON INQUIRY, PHASE 1

## PART I – GENERAL AND OVERVIEW / SUMMARY

### I.A. INTRODUCTION

1. The contamination of drinking water in Walkerton in May of 2000 was a human tragedy that has left a permanent mark in the minds and hearts of that community and indeed, far beyond.

2. The gravity of the tragedy is illustrated by the numbers of people who became ill and even died because of the contamination of the Walkerton water supply by E. coli 0157:H7 and campylobacter bacteria. 1346 cases met the outbreak team investigation's case definition; 65 people were admitted to hospital; 27

people developed the very serious complication of haemolitic uremic syndrome; and 7 people died from the contamination of the water. Of those who became ill, 59% were Walkerton residents; the majority of the rest were visitors to Walkerton on the Mother's Day weekend.

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3. Apart from the human health impact, there are other dimensions of this tragedy. The tragedy has also directly affected the social and economic fabric of the community. Residents cannot simply forget the range of emotions experienced at the time. Moreover, there was a financial price to pay for tragedy whether loss of business, loss of income or extra expenses. A community known for its charm and friendliness is now best known for this tragedy.

4. There is, however, another dimension to this tragedy that has had province-wide and perhaps even nation-wide impacts. Before May of 2000, most Canadians turned the tap on for a drink of water with the full confidence that the water was clean and safe for consumption. The thought that illness and death could occur on the scale that it did in Walkerton was virtually unthinkable. Now, however, that sense of confidence and trust in the safety and security of drinking water supplies has disappeared.

5. The loss of confidence in municipal drinking water systems is a tragedy in and of itself. Drinkable water is an essential, irreplaceable necessity for human survival. It is for this reason that potable water is referred to a "social resource." The likely alternative, bottled water, is far more expensive, and thus inaccessible, to many, and has its own set of human health and environmental issues.

6. As a result of the tragedy, people are left to ask what exactly went wrong and why. The tragedy also has made the public profoundly question the adequacy of the laws, policies, resources, practices and institutional mechanisms to protect both the drinking water for the people of Walkerton, but indeed, all Ontarians. These questions represent, in effect, the core mandate of the Walkerton Inquiry.

7. This argument is being submitted by Concerned Walkerton Citizens (CWC). CWC is a community group comprised of residents of Walkerton and the immediate area. The group was specifically formed in early June 2000 to seek a public Inquiry, to make submissions as to the terms of reference to the Inquiry, to seek party status at the Inquiry, and to fully participate in, the Walkerton Inquiry to ensure that the views and perspectives of local residents

were presented at the Inquiry.[1] More specifically, its published mission statement and objectives are as follows:

> ***Mission Statement***: *The CWC – Concerned Walkerton Citizens – seek intervener status in the Public Inquiry probing the Walkerton E. colioutbreak. We require direct input into the terms of reference of the Inquiry. We believe our full participation is vital to restore the confidence of all citizens in Ontario in the government's ability to ensure the safety of our drinking water supply.*

8. CWC's membership has grown steadily since June of 2000. Its present list is now over 500 residents. The membership is as diverse as the community itself. CWC is an unincorporated association and is organized through a steering committee. The steering committee is comprised of an executive committee and a board of directors.

9. Since June 2000, CWC members, and in particular, members of its steering committee, have spent literally thousands of volunteer hours assisting the community in many ways. These activities include: organizing public meetings; organizing special events; providing liaison with local and provincial officials and the media; and assisting members of the public in a variety of ways.

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[1] CWC's objectives were drafted at a steering committee meeting on June 7, 2000 with its first public meeting on June 15, 2000. CWC's objectives are as follows:

(1) *Gaining full intervener status at the Public Inquiry.*
(2) *Upon the granting of intervener status, ensuring that the Government of Ontario grant full funding to the Concerned Walkerton Citizens to cover any costs incurred throughout the duration of the Inquiry.*
(3) *Guaranteeing that the scope of the Public Inquiry will examine all events and all contributing factors which led up to the outbreak of E. coli contamination in Walkerton, with the intent of preventing such a tragedy from ever occurring any where else in the province.*
(4) *Ensuring public accessibility to the proceedings by holding the Inquiry in Walkerton.*
(5) *Allowing the media full open access to the Inquiry so that accountability is ensured.*
(6) *Having officials issue regular reports on the proceedings throughout the duration of the Inquiry.*
(7) *Determining the root cause of the E. coli contamination and ensuring that specific measures are implemented by all levels of government in order to prevent this situation from ever occurring again.*
(8) *To field any questions or concerns that individuals have to appropriate sources.*

10. CWC attained party status in September of 2000 with respect to both Part IA of the Inquiry (that dealt with the more direct causes to the tragedy) and Part IB (that dealt with the role of government practices, policies and processes). Moreover, CWC is participating in various processes within Part II of the Inquiry that deals with the Commission's broader mandate to make recommendations as to how to ensure the safety of the province's drinking water generally.

11. CWC's interest in this Inquiry has been consistent throughout its tenure. While the community needs to know how and why the tragedy occurred, an equally important component of the aspect to determine what is needed to ensure as much as possible that such a tragedy does not occur again in any community.

12. This argument is structured and presented As follows. A series of "findings" are made throughout the paper that attempt to explain what happened and why with respect to both Part Ia and Part Ib of the Commission's mandate. Further, these findings are followed by recommendations that are aimed at protecting potable water resources with the goal of preventing a repeat of the Walkerton tragedy.

13. The format of this argument and a summary of findings are presented below. Before discussing the actual findings, however, it is important to discuss our submissions on what is meant by a "cause" of this tragedy.

## I.B. THE COMMISSION'S MANDATE AND THE INTERPRETATION OF THE TERM "CAUSE"

14. The Terms of Reference for the Walkerton Inquiry require the Commission to inquire into:

> (a) the circumstances which caused hundreds of people in the Walkerton areas to become ill, and several of them to die in May and June of 2000, at or around the same time as Esherichia coli bacteria were found to be present I the town's water supply;
>
> (b) the cause of these events including the effect, if any of government policies, procedures and practices; and
>
> (c) any other relevant matters that the commission considers necessary to ensure the safety of Ontario's drinking water,

in order to make sure findings and recommendations as the commission considers advisable to ensure that safety of the water supply system in Ontario.[Emphasis added]

Background Information, Commission of the Walkerton Inquiry, Canada Newswire, June 16, 2000, pp. 1&2

**Broad Definition of "Cause" to Include Conditions that Could Lead to Tragedy**

15. In order to identify the causally relevant factors leading to the Walkerton tragedy, the Commission must consider both the "causes" and "conditions" which directly or indirectly gave rise to the tragedy. Of necessity, this requires the Commission to undertake a broad and comprehensive analysis of all antecedents potentially related to the tragedy:

> Every event or occurrence is the result of many conditions that are jointly sufficient to produce it. This complex set of conditions includes all antecedents, active or passive, creative or receptive, that were factors actually involved in producing the consequence. In particular, it embraces both "causes" and what are commonly called mere causal "conditions".…
>
> Fleming, *The Law of Torts* (9th ed., 1998), p.219

16. In a 1988 text on the subject of causation, authors Hage and Meeker note that in current work on causation, cause is viewed probabilistically, and an event is assumed to often or usually have more than one cause. They quote philosopher J.L. Mackie in 1965 to the effect that:

> there may be complex conditions combined to create an effect, any one of which is 'an insufficient but necessary part of a condition which is itself unnecessary but sufficient for the result'.
>
> Jerald Hage and Barbara Foley Meeker, *Social Causality* (Boston: Unwin Hyman)

**Multiple Causes Leading to Tragedy**

17. For the purposes of establishing "cause", it is submitted that the Commission should apply the *causa sine qua non* (or "but for") test when evaluating the evidence. In particular, when determining if a particular event, act or omission "caused" the Walkerton tragedy, the Commission should ask whether the tragedy would not have occurred "but for" the impugned event, act or omission. If the answer is in the affirmative, then it may be safely concluded that a particular event, act or omission helped "cause" the tragedy.

18. Conversely, if the Commission finds that the Walkerton tragedy would have occurred with or without the particular event, act or omission, then it cannot be concluded that it was a "cause" of the tragedy. However, even if a

particular event, act or omission is ruled out as a cause-in-fact of the Walkerton tragedy, it can still be found to be a "condition" or contributing factor if it created or materially increased the risk that the Walkerton tragedy would occur in May 2000.

19. Moreover, it is open to the Commission to find that there were multiple or successive causes of the Walkerton tragedy. In other words, there is nothing in the Terms of Reference that requires the Commission to identify the single or immediate cause of the tragedy, or to solely focus on the last link in the chain of causation.

20. Another vantage point to this issue is provided by Hage and Meeker. They outline two approaches to explaining events: the first is historical (a description of how circumstances arose to create each event). The second approach is one of generalization (explaining a single event by showing it to be an example of a general law). They state that causal explanations may be of both types. The possibility of multiple causation must always be considered. Furthermore, causal explanation is always open-ended in that it is always possible to look backward for additional prior causes and forward for more intervening mechanisms between the "cause" and the "effect" under study. Indeed, as described below, the evidence suggests that there were, in fact, multiple causes of the Walkerton tragedy.

21. CWC submits that the causes of the Walkerton tragedy are multiple, as will be reviewed in these submissions. Some of these causes played a primary and substantial role while others were of secondary importance but were nevertheless relevant. Furthermore, CWC submits that the opportunities for prevention of such a tragedy again in the future are multiple opportunities, both with respect to the "direct" causes – the sequence of events that occurred leading up to the Walkerton tragedy, and with respect to the "policy" causes – the provincial policy and resource questions which were coincident to, and the back drop to the "direct" causes. These questions before the Inquiry (Phases 1(a) and 1(b) of the proceedings) are roughly analogous to a view of causation as questions with both "historical" and "generalization" aspects. CWC submits that the direct causes cannot be usefully separated from the policy and resources causes and that the most useful recommendations will arise from a consideration of both phases of the evidence in an integrated fashion.

**The Notion of a "Precautionary Inference" Where Information is Incomplete or Inconclusive**

22. Another useful perspective on causation was provided by Jack Weinberg and Joe Thornton in a 1993 publication. They proposed the idea of "precautionary inference" as a method to make scientific judgments when data is incomplete or inconclusive or where significant harm may follow from a false negative judgment. They considered this approach specifically in the area of

judgments involving environmental contamination and health damage. The paper argues that rather than the traditional [epidemiological] approach, in which all confounding variables cannot be controlled and the "webs of cause and effect…are too complex to be fully illuminated by the tools and models currently available…", a precautionary inference approach would rely on "an integrated body of evidence…to consider [not] whether causal relationships have been definitively proven, but whether the body of evidence suggests a plausible hypothesis that harm has occurred."

> Jack Weinberg and Joe Thornton, "Scientific Inference and the Precautionary Principle", published in proceedings of an International Joint Commission workshop June, 1994, "*Weight of Evidence: Issues and Practice, A Report on a Workshop held October 24, 1993"*, pp 20-26.

23. In the case of the Walkerton Inquiry's tasks of identifying the causes of the tragedy, CWC submits that this approach ought to be followed and that the Commission's findings, in weighing the evidence, where necessary, be based on the idea of "precautionary inference" and rely on the evidence before the commission, from both phases 1 and 2 in an integrated manner.

24. Finally, it should be noted that the Commission is not authorized to assign legal responsibility for the Walkerton tragedy, nor can the Commission impose or apportion civil liability for the tragedy. Accordingly, it is not necessary for the Commission to consider or apply tort law's "proximate" cause test regarding remoteness or foreseeability of damages.

## I.C. WHAT WERE THE "CAUSES" OF THE WALKERTON TRAGEDY?

### I.C.1. Overview and General Theory of the Case

25. In light of the approach to understanding causative factors described above, what were the contributing causes of the Walkerton tragedy?

*26.* *It is submitted that this is not the case of one or a few persons doing one or a few things wrong. Instead, the causes of the Walkerton tragedy can be described as a convergence of factors with both direct and indirect causes. The direct causes relate to a series of actions or inactions by local operators and authorities, combined with geology, weather, farm operations and other factors. The indirect causes relate to the original siting and approval of the well, and the inadequacy, the lack of a integration and the under-capacity of laws, regulations, policies, practices and institutions relating to the protection of drinking water in the province and the confusion of roles and responsibilities among those involved in the drinking water system.*

27. The combined or cumulative effect of both the direct and indirect causes suggests that the Walkerton tragedy was caused by a fundamental collapse or system break-down of drinking water protection system in Ontario. By its very nature, the collapse or break-down of the regime suggests that there were multiple causes, both direct and indirect, that must be considered as "causes" of the tragedy. It is neither useful nor necessary to isolate or identify the single most important or direct cause since one of the real problems is that the regime was simply not robust enough to protect the residents when one contributing factor occurred.

28. The CWC submission that there has been a "system breakdown" should not suggest that the drinking water regime in Ontario has ever been sufficiently robust. The fragility of the regime and the complacency that pervaded institutions that had oversight responsibilities to it can be stated as general overriding causes of the tragedy.

29. In summary, it is respectfully submitted that a number of factors (e.g. systemic failures and personal acts and omissions) converged to form multiple causes of the Walkerton tragedy.

## I.C.2 Specific Summary of Causes and Conditions Leading to the Tragedy

30. A summary of the causes and conditions leading to the tragedy are as follows:

Section II A: Pathogens into the Aquifer

- There have been assumptions in the past, including on the part of those dealing with the Walkerton water supply, that "groundwater" is a "good", safe source of water; that its characteristics are stable; and that it is not subject (normally) to bacteriological contamination.

- In the case of Walkerton such assumptions proved to be unfounded. Based on prior and historical information, the vulnerability of the aquifer to bacteriological contamination should have been known by the Public Utility Commission (PUC), the Ministry of the Environment (MoE) and the local health unit.

Section II B: Contaminated Wells and Treatment Failure

- In April and May 2000, Walkerton's drinking water was being supplied by three production wells, known as Well 5 (established 1978), Well 6 (established 1982) and Well 7 (established 1987).

- Wells 5, 6 and 7 are located in karst aquifers, which are characterized by rapid groundwater flow through interconnected networks of solutionally enhanced openings in the bedrock.

- The karstic nature of the aquifers made Wells 5, 6 and 7 vulnerable to contamination due to surface water influence, as was amply documented in numerous reports from 1978 to May 2000.

PART II C: Contamination Entering the Distribution System May 2000

- Well 5 was known to be particularly vulnerable to contamination due to the shallowness of the aquifer, the thin and fractured overburden, and the proximity of nearby livestock farming operations.

- There is an overwhelming case that Well 5 was the only well source of the bacteriological contamination of Walkerton's distribution system in April and May 2000.

- In late April 2000, cattle manure containing E. coli O157:H7 had been spread approximately 100 metres from Well 5.

- There was no run-off collection system beyond the concrete pad; and/or more diffuse contamination from manure spreading (by the adjacent farm or others) just prior to the rainstorms in those times.

- E. coli O157:H7 can survive in the soil and groundwater for prolonged periods of time, particularly, in cool, wet conditions.

- The excessive rainfall events of April and May 2000 (especially May 12$^{th}$) likely permitted E. coli O157:H7 to penetrate downward through breaches in the overburden into the shallow aquifer, which quickly transported the bacteria to Well 5 and nearby springs within days or hours.

- After the May 12$^{th}$ rainfall, bacteriologically contaminated (and turbid) raw water at Well 5 created an excessive chlorine demand that likely overwhelmed the chlorination system, which meant that the water was not effectively disinfected prior to entering the distribution system.

- For various reasons, there was likely little or no chlorine residual within the distribution system that was capable of disinfecting the contaminated Well 5 water prior to its delivery to Walkerton residents in May 2000.

- It is unlikely that the bacteriological contamination of Walkerton's distribution system in May 2000 was caused by the Highway 9 construction project, or by contamination originating from Wells 6 or 7.

II.D - Oversight of Drinking Water Quality

Walkerton PUC

- Prior to and during May 2000, Walkerton PUC Commissioners failed to exercise adequate oversight over PUC planning and management to ensure the health and safety of Walkerton residents.

- Prior to and during May 2000, the Walkerton PUC Manager, Foreman and waterworks staff failed to exercise due care and skill by engaging in long-standing and clearly inappropriate water-related practices, particularly in relation to water testing, treatment and reporting.

Municipality of Brockton

- Prior to and during May 2000, the Municipality of Brockton failed to exercise adequate oversight over PUC planning and management to ensure the health and safety of Walkerton residents.

Health Unit

- As of May 2000, the Bruce Grey Owen Sound Health Unit had received no written adverse results relating to the Walkerton water system since the 1996 divestiture of labs by the Ministries of Environment and Health. The health unit was therefore unable to discharge its responsibility for oversight of the Walkerton water system.

- On the other hand, if the health unit had proactively reviewed its records from all water systems in its area it should have noticed that it was receiving no written adverse reports from Walkerton.

- Both local health units as well as many of the provincial officials in the public health and laboratories branches of the Ministry of Health were of the view that municipal drinking water oversight was not so much their responsibility, but the responsibility of the MoE. This led to a very small allocation of resources to health units for municipal water oversight, as well as to formal policy changes in the mandatory health unit guidelines, reducing health units' roles to reliance on information from other sources, and to a reactive rather than a proactive approach.

Ministry of the Environment

- By the early 1990s, Southwest Ontario was enduring seriously increasing problems of bacteriological contamination.

- By the mid-1990s, the government focused its priorities on regulatory reform and point source pollution (and de-emphasized non point pollution like nutrient controls, groundwater contamination and the like).

- While there was a long history of adverse results within Walkerton, the MoE did not have the focus and or the capacity to understand the implications of those results or take corrective action.

- The problems at the Walkerton waterworks were clearly identified in a series of inspection reports, including issues like sampling frequencies, and but were not followed up upon. MOE focussed on ensuring voluntary compliance as opposed to mandatory abatement in the mid-1990s.

- The MoE in the mid-1990s underwent a shift in policy and placed a priority on voluntary compliance and partnerships with the regulated community as opposed to enforcement.

- Threats to groundwater contamination and the need for action were communicated to the MoE by the Environmental Commissioner's Office and non-governmental groups.

- Numerous MoE documents frequently raised concerns about the adverse impacts on staff and resource reductions would have on environment and human health.

- These risks were communicated by staff to deputy ministers to ministers and eventually to cabinet. Management board staff noted that the analysis by MOE staff was "realistic."

- Neither the deputy minister nor the cabinet requested that a risk management plan be prepared to address the negative impacts that were expected to result to the environment and human health from the substantial reductions.

- The Premier knew, or had access to business plans and other information submitted to Cabinet which outlined the increased risk to the environment and human health arising from the budget reductions. He.did not act in any way to address them. He relied solely on the Environment Ministers to address these matters.

- Ultimately, the Premier, as the leader of the government, is responsible for the actions of his government and his ministers and in particular, for the impacts and risks associated with the dramatic resource and funding reductions and other regulatory and policy reforms.

IIE Laboratory Testing and Notification

- The closure of the provincial water testing laboratories was undertaken with inadequate notice to municipalities and without appropriate measures and a transition plan by the MoE to ensure a proper transition to private laboratories.

- There was confusion as to the obligations of private labs to report adverse drinking water results arising from a number of factors, including the unfamiliarity of the labs with the Ontario Drinking Water Objectives, the quick closing of the provincial labs and the lack of a MoE transition plan to assist in the change from public to private labs.

- A & L's Laboratories' unreasonable interpretation of the Ontario Drinking Water Objectives led it to believe that it was not obligated to report adverse drinking water results.

- The Minister of the Environment should have amended the *Ontario Water Resources Act* (OWRA) to provide clear requirement for notification of adverse results. The Health Minister raised a very serious concern regarding the OWRA and it deserved the utmost attention.

- One factor that contributed to the decision not to amend the notification requirements was the "chill" for new regulatory initiatives that was caused by the work of the Red Tape Commission.

- The Ministers of the Environment must accept responsibility for the impacts arising from the privatization of the provincial water testing labs and the delay in clarifying the notification provisions of the Ontario Drinking Water Objectives.

- Formal and comprehensive regimes for accreditation and certification were not required for private labs that undertook testing for microbiological parameters.

IIF Outbreak detection

- The earliest opportunity for mitigating and preventive action (apart from action that should have been taken when chlorination equipment was unavailable) was in the hands of A&L Laboratories, once it found adverse results in Walkerton's water samples, and of the Walkerton PUC, once it received notice of the results on the morning of Wednesday, May 17th, 2000.

- The MoE should have received independent notification from the lab and alerted the health unit and this would have also provided an opportunity for reaction by the health unit. Although many people would have already been exposed to the pathogens in the system by May 17th, 2000 (because the results reflect samples taken earlier), each earlier date of intervention, e.g. by a boil water advisory or by shutting down the system, had the potential to have prevented hundreds of cases of illness.

- Given the failure of Stan Koebel to advise the MoE or the health unit about the adverse sampling results on May 17th , 2000 and in the following days, (which on their own should have prompted a boil water advisory, even without the

occurrence of the outbreak), the next opportunity for action came with the first signs of the outbreak.

- Water as the potential source was down-played by the health unit. This resulted in a delay of the health unit in reviewing their own records of the Walkerton water system, less focus on water in the initial investigation, delay on the part of the health unit to take its own water samples, the health unit relying on unverified assurances by the PUC, and the health unit passing on unverified information to other persons and agencies.

## PART III - System Findings and Recommendations

### IIIA - Multi-Barrier Protection of Drinking Water

- Drinking water protection requires a multi-barrier approach. Drinking water systems must not rely on only one or few barriers.

- An important aspect of a multi-barrier approach to safe drinking water was described by Dr. Hukowich as the necessity of having “multiple pairs of eyes and multiple hands that go up at the first concern, because not everybody shares the same concerns about the same particular issue…”

- Multi-barrier drinking water protection must include a robust emphasis on at least five elements of the system: source protection, water treatment, distribution, monitoring and response to adverse monitoring results. Furthermore, this system and all of the elements within it must be able to withstand "upsets" to the system.

### III.B - Resources

- There has been over a 50% reduction to MoE staff since the early 1990s and somewhere between a 36% to 39% reduction between 1995 and 2000 with the consequence that the reductions affected the ability of the Ministry to carry out its mandate.

- The resource reductions did impact Operations Division with significant reductions including at least a 25% reduction in staff, including a reduction of 20 staff from the Investigations and Enforcement Branch and 37 Environmental Officers' positions.

- Within the context of these reductions, communal water lost both its priority and focus with an over 50% reduction with respect to staff resources from 1996 to 2000.

- The Southwest region was impacted bystaff and budget reductions. These reductions contributed to the Walkerton tragedy by decreasing the overall

capacity for staff to address communal water systems. This was accelerated with the growing demands and workload of the Ministry.

- The process to develop budget reductions was inappropriate since it was blind to the actual needs of the Ministry to protect public health and the environment.

IIIC. Ministry of the Environment Inspections

- Site inspections of waterworks facilities are very important for measuring compliance and deterring facilities from going out of compliance. In particular, the Sewage and Water Inspection Program (SWIP) was set up in response to the concerns raised by the 1988 Provincial Auditor's report.

- The MoE in June of 1995 advised all municipalities in the southwest region concerning sampling requirements and advised them that a mandatory approach would be applied to ensure compliance.

- Walkerton was on a list of non-compliance municipalities in July of 1997 but was not on the list by October 1997 because it had informed the local district office that it would comply with the minimum sampling requirements.

- By 1997, the MoE did not take a mandatory abatement approach even though it was aware that at least nine municipalities were out-of-compliance with sampling requirements.

- During the entire decade of the SWIP program, there were few, if any, Director's orders. Similarly, there were very few field orders that were issued to municipal water treatment plans. There were no director or field orders issued against Walkerton.

- The MoE only shifted its approach from voluntary to mandatory abatement after the Walkerton tragedy.

IIID. Ministry of the Environment Enforcement

- Most operating certificates for waterworks did not include any terms or conditions that would be subject to enforcement action if they were violated. Similarly, the ODWO was only a guideline that could not be legally enforced.

- In the mid-1990s, the MOE undertook a shift in approach from legal enforcement actions to voluntary compliance.

- There were also significant reductions to staff and resources pertaining to enforcement.

- The number of fines obtained from enforcement activities declined after 1995.

- Historically, the MOE had not undertaken aggressive enforcement policy toward municipalities.

IIIE Contingency Plans and Remediation Plans

- A more precautionary approach to the issuance of a Boil Water Advisory whereby the advisory would have been issued earlier would have been preferable and appropriate.

- Notification measures for the issuance of the Boil Water Advisory were inadequate in that the health unit only relied on the medium of radio to communicate the advisory to the public. The advisory itself should have been more extensive and instructional in nature.

- Institutions, such as one nursing home, were not specifically notified and this lack of notification could have contributed to more illness but for the precautionary approach of the nursing home.

- The municipality did not sufficiently assist the health unit in ensuring that the Boil Water Advisory was communicated to the public. A state of emergency should have been declared by the Municipality of Brockton.

- The PUC should have had its own contingency plan and the lack of the plan contributed to confusion among those with responsibility to respond, and to the lack of appropriate communication.

PART IV Overarching Findings and Recommendations

IV.A Inter Agency Communication and Data Sharing

- A significant issue leading to the tragedy at Walkerton was the lack of inter-agency communication and data-sharing in several respects, pertaining to the drinking water supply system. This issue was systematic in that there were no protocols, policies or procedures to ensure such communication and data-sharing.

- There were gaps in the overall system; a lack of sufficient redundancy and "fail-safe" measures to avoid a single failure going unnoticed and causing a tragedy, and the roles and responsibilities of each agency were not sufficiently clarified.

- There was a lack of accountability for the drinking water system in Ontario. A persistent theme in the evidence was that those involved in the drinking water system, both on a local level and at the provincial level frequently stated that their responsibility for drinking water was quite limited. No clear statutory responsibility was in place.

IV.B The Public Right to Know

- One of the first major legislative initiatives of the government after being elected in 1995 was to exempt the Ministry of Finance from the requirements of the Environmental Bill of Rights (EBR) and temporarily suspend the public notice requirements under the EBR with respect to environmental proposals which related to the government's cost-cutting measures.

- The government also stopped publishing State of the Environment reports, which used to provide a comprehensive overview of the environmental conditions in Ontario. This report was important to the government's planning process in establishing priorities for environmental protection since it identified present and emerging risks to Ontario's environment.

-Until 1994 MoE used to publish an annual record of its enforcement activities in a publication entitled, "Offences against the Environment." Once this publication ceased, enforcement records regarding the number of prosecutions and fines had to be obtained through requests made under the *Freedom of Information and Protection of Privacy Act*.

- Government also failed to disclose information it had about the increased risk to the environment and human health as a result of the budget cuts outlined in its confidential business plan.

IV.C Financing and Governance of Waterworks

- At all times, the Walkerton PUC and the Town of Brockton had sizeable reserves, adequate revenues, and sufficient debt capacity to maintain and upgrade the water supply and distribution system, but they both failed to fund or undertake a number of timely measures to protect drinking water safety (e.g., wellhead protection, Well 5 refurbishing, duplicate chlorinators, automatic chlorine residual analyzers, etc.).

The PUC Commissioners were not sufficiently informed of their "business" in providing safe drinking water and, as such, were not aware of relevant and important issues and matters in the field. They did not clearly understand their role to include oversight of health and safety aspects of the drinking water system that they supervised.

IV.D Training

There was decreased emphasis on technical training of MoE staff throughout the 1990s.

There was not a focused training regime with respect to communal water. There was little evidence and focus on informing staff and making them aware of new strains of pathogens in drinking water.

There has been a steadily decreasing budget and resources for training since the early 1990s.

There was insufficient effort to ensure that operators who were grandparented into operator certification qualifications were sufficiently competent for those positions.

Operator training, including Stan Koebel's training, was not sufficiently comprehensive and robust, particularly with respect to monitoring, disinfection, treatment and new and emerging pathogens.

- Stan Koebel, the PUC manager and Frank Koebel, the foreman, were grandfathered under the operator training regulation. Accordingly, they had never undergone any testing or formal training on operating a municipal waterworks. The increasing cost of training was a disincentive to a more comprehensive and robust training regime.

IV.E Safety Culture

Health unit staff and MoE staff worked on a trust basis with PUC's regarding the drinking water system. This lead to inadequate in-depth scrutiny and evaluation of the operations and results reported, such as the failure of MoE inspection staff to look at and notice systematic falsification of chlorine residual results, as well as the failure to notice systematic falsification of reports as to quantities of chlorine added to the system.

There was also institutional reluctance (contrary to the inspector's recommendation) to take mandatory approaches to enforcement against municipalities and a highly inadequate follow up system for voluntary abatement approaches.

With the governing voluntary approach, the mere statement of an intention to comply with the deficiencies noted was sufficient to close the occurrence report (and usually occurrence reports were not even used for voluntary approaches).

- The voluntary approach did not provide assurance that the issues had actually been dealt with compared to mandatory approaches, which would have required proof of compliance before a matter could be considered "closed" by the MoE officers.

With respect to health unit staff, the result of a non-skeptical approach was an un-verified reliance on statements by PUC staff that there were no adverse results or

problems with the Walkerton water during the outbreak investigation. This also caused repetition of these assurances to others, such as the media and institutions prior to and even after the issuance of the Boil Water Advisory.

IV.F Legislative Amendments

- Prior to May of 2000, there was uncertainty among Walkerton PUC staff, regulatory officials and laboratory operators about the legal status and enforceability of the Ontario Drinking Water Objectives.

- In order to remedy the non-enforceability of the Ontario Drinking Water Objectives, the Ontario government previously proposed in 1990 to enact a *Safe Drinking Water Act*. To date, no government has enacted such a statute.

- Based on the evidence in this hearing, the enactment of a new *Safe Drinking Water Act* is both required and appropriate.

- The presence of a *Safe Drinking Water Act* in May of 2000 may have helped to prevent the Walkerton tragedy by providing a firmer legislative basis for mandatory abatement, by clarifying roles and responsibilities, by setting out clearer duties to report and act upon indicators of unsafe drinking water and by establishing accountability for safe drinking water in Ontario

- The *ex post facto* passage of the *Drinking Water Protection Regulation* (O.Reg. 459/00) (DWPR) allows the inference that Ontario knew (or reasonably ought to have known) that the province's pre-May 2000 drinking water regime was inadequate to protect public health and safety.

- The DWPR is not sufficient to address all the concerns arising from the tragedy and supports the need for a new statutory regime. A *Safe Drinking Water Act* should be the legacy of the Walkerton tragedy.

31. Having regard for these various causes and contributing factors, it is respectfully submitted that the Commission should find that the Walkerton tragedy was ultimately preventable, either in whole or in part. On the evidence, it is clear that local officials and provincial authorities had ample opportunity to identify and mitigate these causes and contributing factors, but failed to do so adequately or at all prior to the Walkerton tragedy. The CWC also submits that similar future tragedies in Ontario are also preventable.

## PART II: CHRONOLOGY AND FINDINGS OF CAUSES

## II.A. PATHOGENS INTO THE AQUIFER

### II.A.1. Vulnerability of the Aquifer to Pathogens

32. The first question in tracing the causes of the Walkerton tragedy is to determine how microbiological pathogens found their way into people's drinking water. Before considering the vulnerability of the wells to contamination and the particular evidence as to how the sources of those wells became contaminated, we review the vulnerability of the aquifers to contamination in the first place, the nature of the two implicated pathogens in the environment, and briefly, the particular issue of nutrient management.

33. There have been assumptions in the past, including on the part of those dealing with the Walkerton water supply that "groundwater" is a "good", safe source of water; that its characteristics are stable; and that it is not subject (normally) to bacteriological contamination.

Frank Koebel Dec. 6/00 120:1-11; Dec. 7/00 134:9-19; 161:13-162:14
Budziakowski Nov. 7/00 246:10-20

34. Groundwater was often historically (and still is in some communities) distributed without any treatment.

Huck Vol. 1, 122:1-7

35. Even with extensive till overlying an aquifer, one cannot rely on the till layers to protect the underlying aquifer from contaminants released at the surface.

Howard Vol. 1, 48:3-10

36. The source areas from which bacteriological contamination can enter will vary widely, according to the geology, hydrogeology, activity, location, timing, meteorology (including both sudden events and long term conditions), pumping rates, etc. However, on the evidence, there are many potential routes, for bacteriological contamination to have entered the ground water that is being used as a drinking water supply, such as:

- karst fractures
- overburden fractures or holes
- other insecure wells, both in use and abandoned
- thin, permeable overburden
- direct connection to surface water
- pumping, altering or reversing natural flow of groundwater giving rise to additional or different sources.

Gilham Feb. 28/01 313:16-132:19

37. As will be discussed in Part II.B.2 below, the best available information would point to subsurface contamination of the shallow aquifer with pathogens in April – May, 2000. Possible scenarios supported by the

evidence include point source contamination from manure storage on the farm adjacent to well 5, probably exacerbated by large rains in late April, and early May, 2000, since there was no run-off collection system beyond the concrete pad; and/or more diffuse contamination from manure spreading (by the adjacent farm or others) just prior to the rainstorms in those times.

38. The best evidence is that overland flow to well 5 following the May 12th rain event was not the primary contributor, nor even the most likely contributor to the contamination event.

Goss Feb. 27/01 102:13-18; 124:12-23; 156:19-24
Gilham Feb. 28/01 150:2-6 [note transcript error – word "reasonable" should read "regional"]
Worthington Report **Exh. 416; Ev. July 19/01
Payment Feb. 28/01 25:1-16; 102:15-18

39. For example, the epidemiological curve was already going up before May 12th, 2000 and indicates contamination of the water supply likely occurred or commenced earlier and at least by May 8th, 2000; quite possibly by May 2nd, 2000 or even earlier, due in part to the range of incuabation periods for E. coli and campylobacter, as well as the onset dates of symptoms.

Payment Feb. 28/01 25:1-16; 102:15-18; Addition to Exh. 254
"Comments on my statements at the Inquiry" (Payment)
Ellis Jan. 11/01 33:18-35:14

40. As will be discussed in more detail later in this argument, wells 6 & 7 screened in a deeper aquifer were unlikely to have been the route for contamination of the water supply, but well 5 is most probably implicated.

Gilham Feb. 28, 2001 158:24-159:3; 131:5-11

41. Only wells 5 and 6 were pumping after May 9th, 2000. In addition, matching cases to the supply of well 5 water was highly co-related; that is, those whose well 5 water concentration was higher to their household between May 6th and 19th had a more likely chance of having been ill. Well 7 water formed a very low portion of the town's overall water in the distribution system on May 11, 12, and 13th.

Ellis Jan. 11/01 69:24-70:2; 101:1-23
Ex. 245 (Ellis undertaking response) p. 1

42. Although the only exact DNA match during the outbreak investigation between an environmental sample and the cases of illness was at a pipe in a pond near well 6, this pipe is fed by a spring and therefore its source is indeterminate. In addition, May 23rd, 2000 testing by the MoE had zero –

zero counts for coliforms and E. coli at wells 6 and 7, but very high coliform and E. coli counts at well 5. DNA testing of the latter showed that E. coli 0157 had been present in those samples.

Ellis Jan. 11/01 71:16-72:11

43. Prior test results indicate prior E. coli results at well 5. Although not all test results can be assumed to relate to the location indicated on the sample, it seems that at a minimum, many, if not most samples, including mis-labelled samples, were taken at well 5.

Frank Koebel Dec. 6/00 123:1-15; Dec. 7/00 7:24-8:2

44. The vulnerability of the aquifer to bacteriological contamination should have been known by the PUC, the MoE, and the health unit (as will be further discussed in Part II.D. of this argument.)

**Recommendation: No groundwater source should be assumed safe. Appropriate treatment should be supplied for all municipal supply systems, whether from groundwater wells or surface water or wells under the influence of surface water.**

**Recommendation**: **Protection is needed for all types of ground water aquifers supplying municipal drinking water, even those with a till overlay.**

### II.A.2. Nature of E. coli/ campylobacter

45. In understanding the events that occurred, it is useful to review the environmental characteristics of the pathogens that were involved in the outbreak. The outbreak was of three pathogens: E. coli 0157:H7, campylobacter jejuni and campylobacter coli.

Ellis Jan. 11/01 23:24-25
McQuigge, health unit report Jan. 9/01 20:22-23

46. E. coli 0157 is mobile; it can propel itself through water and find its way into areas of the distribution system or groundwater by its own locomotion, rather than merely by flow or dispersion of water.

Palmateer Oct. 23/00 123:20-124:25

47. Although relatively easily treated with chlorine in some conditions, turbidity can reduce disinfection effectiveness and thus leave these pathogens viable in the distribution system.

Palmateer Oct. 23/00 45:15-24
Payment Feb. 28/01 104:22-24

48. Sources of E. coli 0157:H7 include cattle, goats, sheep, pigs and wildlife, i.e. it is transmitted in manure. There is cattle farming in the Walkerton area. In fact, 12 of the 13 farms in the Walkerton area are cattle farms. During the outbreak investigation, a somewhat unique identifier was found on the bacteria gene in both the human isolates and in the cattle isolates in the Walkerton area. ("Isolate" means a bacterium cultured from a stool specimen.) Similarly in the DNA testing, the phage type of the campylobacter on at least one farm (cattle) was the same as that of the human patients. Cattle were the likely source of the pathogens in the Walkerton tragedy.

Palmateer Oct. 19/00 61:10-11
Ellis Jan. 11/01 76:6-77:8
Exh. 245 Ellis undertaking response p. 2

49. E. coli0157:H7 can be endemic to herds in an area; a particular strain could circulate through herds in an area for weeks or months.

Ellis Jan. 11/01 74:18-23; 81:23-82:4
Goss Feb. 27 49:2-50:13

50. There have also been assumptions that bacteriological contamination is short-lived (and does not survive well in ground water). E. coli and other pathogens in bacteria can survive in groundwater, often for much greater times than has historically been assumed, as well as in soils, frozen pond or ditch sediment for even longer times of over a year. The bacteria can survive in the environment in soil or groundwater for times ranging from days to many months or more before reaching ground water, or in ground water, before reaching wells. Colder weather or temperatures can result in longer survival times.

Palmateer Oct. 23/00 125-2-126:17; 127:18-128:17
Payment Feb. 28/01 51:16-19; 101:18-19
Goss Feb. 27/01 202:15
Ellis Jan. 11/01 91:4-5

51. The size and timing of the outbreak could indicate a concentrated source, but E. coli 0157:H7 has a low infective dose to humans. As low as 10 to 100 cells could infect a person.

Palmateer Oct. 19/00 60:13-17
Payment Feb. 28/00 37:25-38:3

52. Therefore, a relatively small source could infect much of the community quickly if not barred from the system by shutting down the source, or by effective disinfection, filtration or other methods.

53. The April 2,000 rain events were also important to the events leading to the tragedy, as were the May rain events. Wells 5 and 6 supplied the town for the whole month of April and heavy rains occurred on April 21st that may have been a factor. In addition, there were heavy rains from May 8 to 12 and wells 5 and 6 supplied the town from May 9th to the 16th.

Ellis Jan. 11/01 91:13-25

### II.A.3 Nutrient Management

54. All thirteen farms in the Walkerton area spread some manure in the spring of 2000.

Ex. 245, Ellis undertaking, p. 2

55. The storage practices of the immediately adjacent farm were that they stored manure on a concrete pad in accordance with "best management practices" published by the Ministry of Food and Agriculture. However, contrary to the best management practices, there was no run-off collection system for this manure.

Goss Feb. 27/01 103:19-104:5

56. Interaction with weather conditions (rain events during manure storage or immediately following manure application to fields), along with opportunities for infiltration to the aquifer was a likely source of the pathogens entering at least the shallow aquifer into which well 5 was screened.

Goss, Feb. 27, 126:21-24

57. The issue of nutrient management is integrally related to the issue of well-siting practices and source water protection issues which will be discussed in more detail later in this argument. The use of best management practices (except for manure run-off collection) on the adjacent farm did not prevent the disaster in Walkerton. The agricultural best management practices are more directed at preventing surface water contamination than ground water protection.

Goss, Feb. 27/01 46:6-13; 73:14-76:22

**Recommendations include:**

- **Imposing controls over density of application of manure,**

- **Tracking applications of manure and biosolids – for example by way of a publicly accessible data base and requiring oversight and enforcement by the Ministry of Environment,**
- **Imposing and enforcing extra controls in farming communities on municipal well siting, monitoring, treatment and contingency plans,**
- **Requiring source surveys and assessments, and**
- **Requiring source protection measures.**

## II. B. CONTAMINATED WELLS AND TREATMENT FAILURE

### II.B.1 Siting and Approval of Wells and Well Construction

58. Since the 1970s, Walkerton officials have tested, established and operated a number of different municipal wells in a continuing search for plentiful source of clean and safe drinking water.

Ex. 56, Tab 4, MOE Report by J. Hunt (1978/79), page 1
Ex. 58, MOE Report by J. Hunt (1975/76), pages 3-4
Ex. 59, MOE Report by J. Hunt (1977), page 1

59. Walkerton's ongoing search for new drinking water sources was historically motivated by concerns about water hardness, rather than concerns about physical, chemical or bacteriological contamination.

Bill Hutchison (Nov. 9/00), pages 16-18 (p.16 line 24-25; p.17 lines 1-25; p.18 lines 1-ll
Frank Koebel (Dec. 6/00), page129 lines 8-24

60. In the mid-1970s, consideration was given by the Walkerton PUC to drawing drinking water from a surface water source located along the Saugeen River (eg. diversion of Otter Creek). However, this option was never pursued or implemented, and to date Walkerton has continued to rely exclusively upon a series of municipal wells for drinking water purposes.

Ex. 59, MOE Report by J. Hunt (1977), page 1
Bill Hutchinson (Nov. 9/00), page 17 line 25; page 18 lines 1-11

61. The chronological history of Walkerton's municipal wells (up to May 2000) can be summarized as follows:

| WELL NUMBER | START DATE | STATUS (May 2000) | COMMENTS |
|---|---|---|---|
| 1 | 1949 | Exists but not in use | Hard water |
| 2 | 1952 | Taken out of service | Hard water |
| 3 | 1962 | Exists but not in use | Low yield |

| | | | |
|---|---|---|---|
| 4 | Not developed | n/a | N/a |
| 5 | 1978 | In use | Shallow well |
| 6 | 1982 | In use | Deep well |
| 7 | 1987 | In use | Deep well |
| 8 | 1999 | Test well | 1 km outside town |

Ex. 5, Mark Ethier Power Point presentation
Mark Ethier (Oct. 17/00), pages 21-32

62. During April and May 2000, Walkerton was relying upon Wells 5, 6 and 7 for drinking water purposes. Accordingly, the CWC submits that it is instructive to briefly review the initial establishment and operation of each of these three wells.

**a) Well 5: Siting and Approval**

63. Well 5 is located on Wallace Street in the southwest area of Walkerton. Well 5 is a shallow well (58 feet) that was constructed in 1978.

Ex. 5, Mark Ethier Power Point presentation

64. Well 5 was capable of providing 56% of Walkerton's water demand. Disinfection of raw water at Well 5 was provided by sodium hypochlorite (bleach) solution.

Ex. 5, Mark Ethier Power Point presentation

65. The chlorination equipment at Well 5 "acted up" from time to time, as the injector hole for the bleach solution would occasionally "grow shut". In order for PUC staff to fix such problems, Well 5 would have to be shut down.

Stan Koebel (Dec. 18/00), page 69 lines 20-25; page 70 lines 1-25
Frank Koebel (Dec. 6/00), page 124 lines 2- 25; page 125 lines 1-9; page 127 lines 9-12

66. Well 5 was constructed without the requisite approval under the *Ontario Water Resources Act*.

Bill Hutchinson (Nov. 9/00), page 96 lines 18-25; p.97 lines 1-25; p.98 lines 1-21
Stan Koebel (Dec. 18/00), page 49 lines 23-25; p.50 lines 1-10

67. The construction of Well 5 without approval prompted the MOE to convene an extraordinary meeting on November 23, 1978 with Town and PUC officials to discuss the apparent non-compliance with the *Ontario Water Resources Act*. The certificate of approval for Well 5 was subsequently issued

in January 1979, although MOE policy prohibited the issuance of approvals for already constructed works. Significantly, the approval did not impose any explicit terms and conditions regarding: (a) sampling; (b) operating manuals; (c) chlorine residuals; or (d) the establishment of a wellhead protection zone through land use restrictions or property aquisition. From the 1960s to the 1980s, it was not the MOE's practice to include such conditions in these types of approvals.

J. Budziakowski (Nov. 8/00), page 133 lines 23-25; p. 134 lines 1-16
Bill Hutchinson (Nov. 9/00), page 98 lines 1-21; page 133 lines 19-25; p.134 lines 1-2
Ex. 56, Tab 2, Meeting Minutes (Nov. 23/78)
Ex. 56, Tab 3, Certificate of Approval for Well 5 (Jan. 24/79)

68. At the 1978 meeting, MOE staff highlighted their concerns about the vulnerability of Well 5 to contamination due to the shallowness of the overburden and aquifer. MOE staff further suggested that nitrates found in the wellwater during pump tests might be attributable to nearby farming operations on Percy Pletch's property. In fact, Well 5 was constructed approximately 20 feet from the fence line of the Pletch farm. Accordingly, the MOE recommended that Percy Pletch be approached to discuss property acquisition or land use restrictions. The PUC officials agreed to do so, but this was not imposed as a condition of approval for Well 5.

Ex. 56, Tab 2, Meeting Minutes (Nov. 23/78), page 2
Bill Hutchinson (Nov. 9/00), page 42 line25; p.43 lines 1-25; p.44 lines 1-25; p.45 lines 1-2; p.126-129

69. However, the Well 5 approval did require construction of an oversized (24 inch) 180 foot forcemain leading from the pumphouse to the distribution system in order to ensure 15 minutes' chlorine contact time. It appears that this oversized pipe was not constructed, as the PUC subsequently decided to install a small diameter pipe elsewhere in the distribution system to service the first few residences served by Well 5 water. The approval was not amended to permit this alternative method of achieving 15 minutes' chlorine contact time.

J. Budziakowski (Nov. 8/00), page 226-231
Bill Hutchinson, (Nov. 9/00), page 55 line 12-23; p.63 lines 1-25; p.64 lines 1-18; p. 66 lines 14 –25, p.67-69
Ex. 56, Tab 4, MOE Memo Re: Walkerton Water Works by J. Hunt (1978/79), page 2

70. Aside from occasional minor repairs, no real maintenance was done on Well 5 from 1980 to May 2000.

Jim Kieffer (Nov. 17/00), page 88 line 6-9
Frank Koebel (Dec. 6/00), page 128 lines 9-25; p.129 lines 1-5
Ex. 102, Tab 9, April 8, 1998–Regular meeting of Walkerton Public Utilities Commission, page 9; Regular Meeting of Walkerton Public Utilities Commission on December 8, 1998, page 35

**b) Well 6: Siting and Approval**

71. Well 6 is located at Bruce County Roads #2 and #32 west of Walkerton. Well 6 is a deep well (237 feet) that was constructed in 1982. The Certificate of Approval for Well 6 was issued by the MOE in November 1982.

Ex. 5, Mark Ethier Power Point presentation
Ex. 56, Tab 7, Certificate of Approval for Well 6 (Nov. 19/82)

72. Well 6 is capable of providing 52% of Walkerton's water demand. Disinfection of raw water at Well 6 is provided by chlorine gas.

Ex. 5, Mark Ethier Power Point presentation

73. Well 6 lacked a back-up (or duplicate) chlorinator as a contingency measure in the event that operational problems were experienced, or that maintenance or repairs were necessary.

Mark Ethier (Oct. 17/00), page 14 line 9-13

74. Well 6 technically could be run without chlorination equipment in place to disinfect raw water. For example, it appears that during 1999, Well 6 was operated without a chlorinator for approximately three months. In the view of Stan Koebel, running a well without a chlorinator for more than a few days would be a concern.

Stan Koebel (Dec. 18/00), page 79 lines 1-12 and 25; p.80-81; p.82 lines 1-9; p.83 lines 2-5; p.84 lines 1-7

75. A 2 km trunk line to Well 6 was built by the PUC in 1982 without the requisite approval under the *Ontario Water Resources Act*.

Stan Koebel (Dec. 18/00), page 50 lines 12-22

**c) Well 7: Siting and Approval**

76. Well 7 is located at Bruce County Roads #2 and #32 west of Walkerton in close proximity to Well 6. Well 7 is a deep well (250 feet) that was constructed in 1987. The MOE issued a certificate of approval for Well 7 in October 1987.

Ex. 5, Mark Ethier Power Point presentation
Ex. 56, Tab16, Certificate of Approval for Well 7 (Oct. 22/87).

77. Well 7 is capable of providing 140% of Walkerton's water demand. Disinfection of raw water at Well 7 is provided by chlorine gas.

Ex. 5, Mark Ethier Power Point presentation

78. Well 7 lacked a back-up (or duplicate) chlorinator as a contingency measure in the event that operational problems were experienced, or that maintenance or repairs were necessary.

Mark Ethier (Oct. 17/00), page 14

79. The chlorination equipment at Well 7 sometimes had operational problems which caused it to malfunction occasionally. Such problems occurred for several weeks in April 2000. When it was necessary for PUC staff to service the chlorination equipment, Well 7 could be run without chlorination equipment in place to disinfect raw water.

Frank Koebel (Dec. 7/00), page 147 lines 17-25; p.148 lines 1-25; p.149 lines 1-10
Stan Koebel (Dec. 18/00), page 83 lines 6-9

**d) General Comments Regarding Well Approvals**

80. The MOE treated applications for Certificates of Approval from municipalities differently from those made by other applicants. The MOE was of the view that municipalities had an interest in providing safe water and accordingly, the MOE took a co-operative approach to dealing with municipalities and their consultants.

McIntyre, March 6, 2001, 31:20 - 32:1
Gregson, March 6, 2001, 32:2-32-8

81. As described below, the files at the MOE Approvals Branch indicated that concerns had been flagged by MoE staff about the potential for bacteriological contamination of Well 5. Accordingly, MOE staff recommended that the Town of Walkerton should establish a water protection zone (by acquiring property) to the south and west of the production well.

Gregson, March 6, 2001, 61:6-62:1.

82. MOE staff also raised concerns about the applicability of a "continuous chlorine residual analysis and recording" for a well with a known bacterial

history. When Well 5 was constructed and subsequently approved, the MOE did not impose a requirement for continuous chlorine residual analyses and recording for groundwater under the direct influence of surface water. Moreover, neither the Chlorination Bulletin 65-W-4 nor the ODWO in 1978 and early 1979 (when Well # 5 was approved) required continuous chlorine residual monitoring. The MoE was of the view that the quality of groundwater did not change rapidly unlike surface water, and thus would not normally require continuous chlorine residual monitoring. A memo dated November 3, 1982, from Mr. Page raised similar concerns in relation to Well 6 as those raised for Well 5.

Gregson, March 6, 2001, 63:1- 64:24

83. As described below, a Hydrogeological Report prepared by Ian. D. Wilson and Associates dated July 28, 1978 with respect to Well 5 indicates that eight samples were contaminated with pollution from human and /or animal sources. The report went on to recommend that the water supply should definitely be chlorinated, and that the bacteria content and nitrate levels of the raw and treated water should be monitored. It does not appear that the Walkerton PUC staff were aware of the recommendations contained in this report.

Gregson, March 7, 2001, 36: 10- 37:7.
Frank Koebel, December 6, 2000. 126:19-127:1.

84. Subsequent reports regarding Well 5 further indicated that the groundwater supplying the well was subject to influence of surface water. Furthermore, a memorandum dated October 22, 1984 from the Mr. Jay Westwood, Water Resources Technologist to Mr. Greg Powers, Groundwater Technologist, indicated that the groundwater supplying well number 7, which was only a few hundred meters from well 6 was also subject to influence by surface water.

Gregson, March 7, 2001, 69:15- 72:11.

85. Despite this mounting evidence in MOE files regarding the susceptibility of Wells 5, 6 and 7 to influence by surface water, the MOE did not impose any conditions in the Certificates of Approval governing these wells to require filtration, or to monitor for chlorine residuals and turbidity.

Exhibits C of A for Wells 5, 6 and 7.

86. Even when the requirements under the ODWO were revised and imposed more stringent requirements for treating groundwater under the influence of surface water, the MOE did not undertake a systematic review of Certificates of Approvals with a view to imposing additional conditions. By 1994, for

example, section 4.2.11 of the ODWO required monitoring for chlorine residuals and turbidity levels for groundwater under the influence of surface water without filtration. However, the MOE never incorporated any of these new requirements in the approvals for Wells 5, 6 and 7. The MOE also did not have any criteria for assessing whether groundwater was subject to the influence of surface water; and instead simply left this matter to the discretion of the review engineer.

87. Gregson, March 7, 2001, 73:6 - 77:22.

**Recommendation: That MOE formulate criteria for assessing whether groundwater supplying a water works is subject to the influence of surface water. The MOE should ascertain the number of wells in Ontario that meet such criteria. In the event that the criteria are met, MOE should assess whether filtration is required for the water works, and should ensure that conditions are imposed in the Certificate of Approval to monitor for chlorine residuals and turbidity levels.**

**Recommendation: The MOE Approval Branch should be required to undertake a review of all Certificate of Approvals for water works and ensure that there are specific conditions relating to:**

**i. Maintaining specified chlorine residual before the first consumer and within the distribution system;**

**ii. Requiring monitoring and monitoring of specified parameters in the raw and treated water, including descriptions of the location and frequency for monitoring;**

**iii. Ensuring the appropriate operation and maintenance of the waterworks;**

**iv. Requiring owners to ensure protection of the source of the water supply;**

**v. Providing that operators are certified under Regulation 435/93;**

**vi. Developing a contingency plan and procedures and ensure that all necessary equipment is available to deal with any process upset or emergencies; and**

**vii. Imposing notification and reporting requirements as stipulated under the Ontario Drinking Water Standards**

### II.B.2. Vulnerability of Wells 5, 6 and 7 to Contamination

88. From 1978 to May 2000, there were numerous pieces of evidence indicating that Wells 5, 6, and 7 were vulnerable to contamination from above-ground human activities, particularly farming operations. This evidence took various forms, such as consultants' reports, MOE memoranda and inspection reports, and routine monitoring and sampling conducted by PUC staff.

89. Indeed, the Town's own hydrogeological consultant immediately flagged the vulnerability of Well 5 to surface contamination due to the shallow nature of the aquifer, the thin overburden, and the presence of nearby agricultural operations. Such warnings were subsequently echoed by MOE staff in the late 1970s and early 1980s, as described below in more detail.

90. Similarly, in 1991 the Walkerton PUC's engineering consultant (Steve Burns of B.M. Ross) prepared and submitted a funding application to the MOE for the purposes of undertaking a "Needs Study" to identify and prioritize necessary waterworks projects. The funding application acknowledged that the MOE's bacteriological objectives for drinking water were not being met by the Walkerton water system.

Ex.80, Tab 2, "Needs Study" Application, page 39, section 3.6.3
Steve Burns (Nov. 9/00), page 194 lines 17-22; p.200 lines 2-25; p.102-203; p.204 lines 1-6

91. Similarly, the 1996 MOE inspection report by Don Apfelbeck stated that samples taken from the Walkerton water system had revealed the presence of E. coli bacteria, which were clearly identified as indicators of unsafe drinking water.

Ex. 182, Tab 20, MOE Inspection Report by D. Apefelbeck (January 29,1996)

92. More recently, the 1998 MOE inspection report by Michelle Zillinger identified a number of occasions when samples indicating unsafe drinking water (eg. presence of E. coli) were taken from Walkerton's water system, including Well 5. This 1998 report was ultimately received by Stan Koebel, the PUC commissioners, the Town of Walkerton, and the local health unit.

Ex. 102, Tab 9, PUC Meeting Minutes (May 1998), page 9
Ex. 122(a), Walkerton Council Meeting Minutes, page 154
Ex. 182, Tab 23, MOE Compliance Inspection Report Communal Drinking Water, Appendix D, by M. Zillinger (Feb. 25, 1998)
Stan Koebel (Dec. 19/00), page 22 lines 8-25; p.23; p.24 lines 1-8
Jim Kieffer (Nov. 16/00), page 196 lines 16-23; p.128 line 25; p.129 lines 1-5
Richard Field (Nov. 27/00), page 95 lines 17-25; p.96 lines 1-3

James Bolden (Nov. 28/00), page 181 lines 15-25; p.182-188; p.214 lines 18-25; p.215 lines 1-14
James Bolden (Nov. 29/00), page 8 lines18-25; p.9-13

93. In general, the presence of E. coli bacteria in wellwater should be rare. If E. coli bacteria are detected within a distribution system, then "alarm bells" should be sounding for all officials who operate or oversee that system. With respect to Walkerton in particular, the fact that E. coli bacteria were being detected at Well 5 and in the distribution system with increasing frequency from 1995 to 1998 ought to have set off alarm bells.

Bill Hutchinson (Nov. 9/00), page 173; p.174 -177; p.181 lines 22-25; p.182 line 1-5

94. Finding bacteria in a public water supply or distribution system a day or two after a contamination event is too late for the purposes of protecting public health and safety. By this time, consumers of the water will already have been exposed and/or sickened by the pathogen(s), and *ex post facto* measures, such as flushing or superchlorination, will have little effect in preventing the outbreak (although they may reduce numbers of new illnesses).

Dr. Pierre Payment (Feb. 28/01) page 24 and pages 76-77

95. The CWC submits that the MOE, Stan Koebel, the PUC, the Town of Walkerton, and the local health unit knew, or ought to have known, prior to May 2000 that all three wells (especially Well 5) were vulnerable to contamination. Despite this knowledge, however, it is manifestly apparent that these parties, both individually and collectively, failed to take adequate and timely measures to prevent the Walkerton tragedy from occurring in May 2000.

96. In order to fully understand the preventable nature of the Walkerton tragedy, it is necessary to carefully review the hydrogeological setting and vulnerability of each of Walkerton's production wells prior to May 2000, as set out below.

**a) Hydrogeological Setting of Wells 5, 6 and 7: An Overview**

97. Wells 5, 6 and 7 draw water from "karst" aquifers that have formed in the carbonate bedrock underlying these wells (dolostone at Well 5 and limestone at Wells 6 and 7). Karst aquifers are characterized by the presence of interconnected networks of solutionally enhanced fractures, known as "channels" or "conduits". Most groundwater flow in karst aquifers is through these conduits.

Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), pages 2-3

Ex. 417, Dr. Stephen Worthington Power Point presentation, slide 12
Dr. Stephen Worthington (July 19/00), page 24-29; p.45; p.62-63; p.109-110; p.174 lines 7-12

98. Karst aquifers are highly productive and are widely used for public water supplies. However, karst aquifers have been identified as being particularly susceptible to fecal contamination because such aquifers can transport contaminants over long distances in relatively short periods of time. Groundwater flow velocity through karstic conduits can average 1.7 km/day (or one mile/day) or higher.

Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), page 2
Ex. 261, "Matrix, Fracture and Channel Components of Storage and Flow in a Paleozoic Limestone Aquifer" by Worthington et al. (2000), pages 113 and 118
Ex. 264, US EPA Proposed Ground Water Rule (May 2000), page 30222
Ex. 417, Dr. Stephen Worthington Power Point presentation, slides 9 and 12

99. The high flow velocities and complex flow patterns of karst aquifers make it inappropriate to use porous media computer models (eg. the MODFLOW model used by Golder Associates) to simulate contaminant transport through the conduit network. Tracer testing is the preferred method of determining contaminant pathways and time-of-travel in karst aquifers.

Ex. 256, Dr. Robert Gillham Power Point presentation, slide 45
Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), page 32
Dr. Robert Gillham (Feb. 28/01), page 121, 143, 160-161
Ex. 228, Appendix A, GAP Report (Sept. 29/01), Appendix 1, page 88

100. The primary contamination hazard in karst aquifers is caused by areas or features which allow surface water (and any contaminants therein) to penetrate downward into the aquifer. Such areas or features include: ponds, springs, exposed bedrock, thin overburden, poorly grouted wells, fence posts, excavations, tree roots, and macropores in the soil. As described below, many such pathways exist within the source areas of Wells 5, 6 and 7.

Ex. 417, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), page 7
Dr. Robert Gillham (March 1/01), page 54 lines 18-12; p.113-119

101. Evidence indicating the presence of karst aquifers at Wells 5, 6 and 7 includes:

(a) the high hydraulic conductivity values reported by Golders Associates clearly fall within the range identified for karst aquifers;

Exhibit 261, *Groundwater* by Freeze and Cherry, page 29
Dr. Robert Gillham (March 1/01), pages 126-27 lines 20-25; lines 1-22
Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), page 8

b) groundwater velocity calculations, based upon the above-noted hydraulic conductivity values, fall within the range identified for karst aquifers;

Ex. 417, Dr. Stephen Worthington Power Point presentation, slide 6
Dr. Stephen Worthington (July 19/01), page 23 line 2-21

c) the presence of "lost circulation zones" or water producing zones in the Bois Blanc Formation (Wells 6 and 7), indicating that it contains highly permeable strata;

Ex. 259, *Report on Hydrogeological Assessment: Bacteriological Impacts, Walkerton Town Wells* by Golder Associates (Sept. 2000), page 30
Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), page 8

d) the presence of several significant springs in close proximity to Wells 5, 6 and 7;

Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), page 9

e) the measured discharge rate at the above-noted springs demonstrates convergent karstic flow from large source areas;

Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), page 9

f) flow metering, gamma logs, electrical conductivity, and video data demonstrate that groundwater inflow into Wells 5, 6 and 7 is limited to a few bedding planes (near-horizontal fractures), and most of this flow is from karstic conduits;

Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July
9, 2001), pages 9-10 and 24
Ex. 417, Dr. Stephen Worthington Power Point presentation, slides 15-17, 30 and 33
Ex. 418, Well Inspection Video from Wells 5, 6 and 7

Dr. Stephen Worthington (July 19/011), pages 57-59

g) the occurrence of voids (or bit drops) in the boreholes for Wells 5, 6 and 7; and

Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), at page 11
Dr. Stephen Worthington (July 19/01), page 33-37; p.111

h) analysis of the water chemistry data from the wells demonstrates that the limestone and dolostone bedrock is being dissolved.

Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), at page 11

102. On the basis of the foregoing evidence, there is no doubt that Wells 5, 6 and 7 are located in a karstic hydrogeological setting.

Dr. Stephen Worthington (July 19/01), page 24 lines 12-21
Dr. Robert Gillham (March 1/01), page 52 lines 4-25; page 53 lines 1-24; and page 123 lines 18-20

103. Even if the karstic nature of the hydrogeological setting of Wells 5, 6 and 7 was not known or well-understood by municipal and provincial officials prior to May 2000, there has been over 20 years' worth of water sampling and monitoring data which clearly indicated the vulnerability of each well to contamination, as described below. Indeed, from the 1970s to May 2000, sampling conducted by the Walkerton PUC and the MOE periodically detected coliform and/or E. coli bacteria in Walkerton's water supply and distribution system. In this context, the detection of E. coli in the Walkerton water system in May 2000 was neither surprising nor unprecedented.

Ex. 19, Tab 5, Summary of GAP Water Sample Analyses (as amended/updated by Addenda prepared by Miller Thomson)

104. Based on the available evidence, Wells 5 and 6 were vulnerable to bacteriological contamination via the groundwater flow system, and such contamination was likely occurring on a regular basis for years prior to May 2000. Well 7 was also vulnerable to bacteriological contamination from surface sources, but to a lesser degree than Wells 5 and 6. The principal reason for such ongoing contamination is that these wells were drilled in unfortunate locations (near springs) in karst aquifers. This is particularly true in light of the widespread livestock farming operations in the Walkerton area which can serve as sources of bacteriological contamination.

Steve Burns (Jan. 17/01), pages 129–134, 193 lines 4-20

Ex. 256, Dr. Robert Gillham Power Point presentation, slides 11, 18-19
Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), pages 34-35 and 37
Ex. 260, Dr. Peter Huck Power Point presentation, slide 67
Ex. 258, Interim Report on Hydrogeological Assessment by Golders Associates (Aug. 18/00) pages 32 –34

**b) Vulnerability of Well 5 to Contamination**

105. The bedrock in the vicinity of Well 5 is karstic dolostone. In addition, Well 5 is well-connected to the conduit network feeding the springs, with the water taking less than one hour to move from the springs. Moreover, the overburden in the catchment area for the springs and Well 5 is thin (less than 3 m), and there are highly permeable gravel deposits in the catchment area. Accordingly, there are several possible windows through which bacteria (and other contaminants) can reach the aquifer and be transported to Well 5 and the springs.

Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), pages 35-36

106. The vulnerability of Well 5 to contamination was known from the outset that Well 5 was first drilled and tested. In particular, the 1978 hydrogeological report from the Town's consultants indicated that Well 5 provided good quality water, but was subject to surface water influence. In particular, the report stated that:

> The water producing zone in Test Well 2 is shallow at 16 to 19 feet and the well is close to a barnyard and swampy area… These facts raise questions as to the suitability of this site as a long-term source of supply for the town. Obviously, there is potential for pollution and shallow aquifers can sometimes prove unreliable as sources of supply…
>
> Because of the nature of the aquifer in this area, the supply must be carefully protected… The Town of Walkerton should consider establishing a water-protection area by acquiring additional property to the west and south in the vicinity of Well 5. <u>Shallow aquifers are prone to pollution and farming and activities should be kept away from the site as far as possible</u> (emphasis added).

Ex. 182(a), Tab 2, Report on the Testing of the Town Walkerton Well 4 (July 28, 1978), page 13

107. In commenting upon the Well 5 application for approval, the MOE's District Officer (Willard Page) highlighted the shallowness of the overburden and

aquifer at Well 5, and he endorsed the consultant's proposal that land use be controlled in and around Well 5.

Ex. 56, Tab 1, Memo to N. Borodczak from W. Page (Oct. 24/78), page 2

108. Another MOE memorandum from the late 1970's (and copied to the PUC and Town of Walkerton) confirmed the connection between the surface and the Well 5 aquifer:

> This increase in the pumping level coincided generally with a spring thaw and period of rain. This appears to confirm the relatively direct communication between this aquifer and the surface…
>
> Well #5 is to be monitored regularly by the municipality to ensure that such parameters as nitrates, total organic carbon, and phenols indicative of contamination originating from the surface do not increase beyond acceptable levels…
>
> It has been recommended that the Town of Walkerton endeavour to exercise some control over surface activities within the area underlain by the cone of influence of Well #5. Any efforts to seek control over land use activities in this area should be continued.

Ex. 56, Tab 4, MOE Memorandum by J. Hunt (1978/79), page 3

109. Similar concerns were repeated by in an MOE memorandum authored by Dan Brown (who subsequently left the MOE to join Golder Associates, which was eventually retained by the Town of Brockton as a hydrogeological consultant). In particular, Dan Brown opined that:

> The addition of Well #5 to the Walkerton water supply in 1978 was a very important contribution to the system in terms of both quantity and quality of water provided; however, due to the shallow nature of the bedrock aquifer, the supply is very susceptible to surface human activities.

Ex. 75, Tab 7, Memo to W. Hutchinson from D. Brown (Feb. 8/80)

110. In the fall of 1982, MOE sampling at Well 5 revealed the presence of coliform and fecal coliform in raw and treated water.

Ex.182(a), Tab 17, Water Works Inspection Report by A. Clark (Sept. 16/82), page 2

111. During his employment with the Walkerton PUC, Stan Koebel was aware that the PUC had traditionally regarded Well 5 as a short-term, "band aid"

solution. As a result, the general PUC practice was to avoid using Well 5 if possible (except in the spring and fall) to avoid excessive drawdown of the shallow aquifer.

Stan Koebel (Dec. 18/00), page 34, lines 10-14
James Bolden (Nov. 28/00), page 162, lines 11-25; page 163, lines 1-4

112. In addition, the local MOE officials understood that Well 5 would only be used as a temporary solution as Walkerton continued its search for a long-term source of soft water. However, no time limit or expiry date was placed by the MOE on the Well 5 approval.

Bill Hutchinson (Nov. 9/00), pages 59-60, 103-105 and 125-129

113. The well-known vulnerability of Well 5 prompted Stan Koebel to raise concerns in 1990 about a proposal to install fuel storage tanks near Well 5.

Stan Koebel (Dec. 18/00), page 42-43

114. Despite these concerns about Well 5's vulnerability to contamination, Well 5 remained available for use since the PUC perceived no immediate reason to take it out of service.

Stan Koebel (Dec. 18/00), page 47, lines 9-25

115. Similarly, despite the consultant's 1978 recommendation to properly buffer Well 5, neither the Town nor the PUC approached the neighbouring landowner (Percy Pletch or Dr. Beisenthal) to discuss the potential acquisition of some property for well protection purposes.

Percy Pletch (Nov. 8/00), page 90, lines 5-21
James Bolden (Nov. 28/00), page 162-164

**c) Vulnerability of Well 6 to Contamination**

116. The bedrock at Well 6 is limestone, which is considered to be even more karstic than the dolostone found at Well 5. The capture zone for Well 6 includes substantial areas where the overburden is less than 10 m, and close to the well the overburden is only 3 m thick. The combined capture zone for Wells 6 and 7 may be as large as 500 hectares (2 square miles).

Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), pages 37-38

117. Post-May 2000 sampling at Well 6 revealed the presence of aerobic spore-producing organisms, which are indicative of surface water influence at Well

6. In addition, in August 2000, significant coliform contamination was detected at Well 6 following heavy rainfall events.

Ex. 228, OCWA Report to the Walkerton PUC (Oct. 17/00), pages 41 and 47
Ex. 228, Appendix A, GAP Report (Sept. 29/00), page 27

118. It should be further noted that E. coli 0157:H7 was found in a water pipe connecting two spring-fed ponds near Well 6. The DNA fingerprint of this sample is the same as the E. coli strain implicated in the illness suffered by Walkerton residents in May 2000. However, there is no ready explanation or evidence indicating where this sample came from or how it came to be present in the water pipe.

Ex. 228, OCWA Report to the Walkerton PUC (Oct. 17/00), Appendix A, GAP Report (Sept. 29/00) page 19
Dr. Robert Gilham (March 1/01), page 120-122
Ex. 417, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2000)
Ex. 254, Tab 2, Dr. Pierre Payment Power Point presentation, slide 61

119. Pumping tests conducted after May 2000 at Well 6 demonstrate that at least one of the above-noted ponds is hydraulically connected to Well 6. These pumping tests also caused a significant drawdown of the spring located between Well 6 and 7. The results of this pumping test – and the corresponding variations in electrical conductivity at the spring – demonstrate that the spring is well-connected to the aquifer that feeds Well 6.

Ex. 256, Dr. Robert Gillham Power Point presentation, slides 17 and 38
Dr. Robert Gillham (March 1/01), page 23
Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2000), page 30 and 38
Ex. 419, Response to Karst Report (July 6/01), page 3

120. Evidence of Well 6's vulnerability to contamination was also available prior to May 2000. For example, in 1982 Dan Brown (while still with the MOE) authored a memorandum that raised some concerns about the susceptibility of Well 6 to agricultural contaminants such as nitrates:

> The nitrate concentration of 2.9 mg/l is not a serious concern; however, the level did increase with pumping and the overburden thickness in the area is limited. The area is agricultural, but no significant point sources of nitrogen are nearby. Reportedly, the Town plans to purchase a sizeable piece of property around the well which would provide some buffer from inappropriate land uses. The water quality of this

> supply should, of course, be monitored so that any problems will be foreseen.
>
> Ex. 56, Tab 8, Memo to W. Page from D. Brown Re: Proposed Production Well No. 6 Town of Walkerton (Oct. 29/82)

121. A subsequent MOE memorandum identified potential vulnerability of Well 6 through the overflow pipe, and recommended that certain steps be implemented to prevent such contamination.

> Ex. 56, Tab 12, Letter to I. McLeod Re: New Production and Observation Wells, Town of Walkerton File No. M&P 11-06 from W. Page (Nov. 22/83)

122. On the same date, the MOE also wrote to the Walkerton PUC in respect of a groundwater interference complaint by Ron Gregg, who indicated that pumping at Well 6 had dried up the spring on his farm. This complaint appears to have been given credence by MOE staff:

> It is possible that the upper water entering TW2 is hydraulically connected to the spring on Mr. Gregg's farm. Therefore, its removal may have affected or [sic] the spring flow (by entering TW2 and then moving to the production well).
>
> Samples were taken on October 6, 1983 from the production well (untreated) and the water cascading into TW2. Analyses results (Appendix A) indicate that the upper water is higher in nitrate, total phosphorus, potassium, chloride and sodium suggest that agricultural contaminants are present and are gaining access to the public supply (emphasis added).
>
> Ex. 56, Tab 13, Letter to I. McLeod from G. Powers (Nov. 23/83), page 2
> Ex. 56, Tab 14, Letter to I. McLeod from D. McTavish (Aug. 9/84)

123. After May 2000, the use of Well 6 has been discontinued due to the periodic presence of bacteriological contaminants.

> Steve Burns (Jan. 18/01), page 185, lines 9-15
> Dan Brown (July 19/01), page 175
> Ex. 228, OCWA Report to the Walkerton PUC (Oct. 17/00), page 41

**d) Vulnerability of Well 7 to Contamination**

124. The bedrock at Well 7 is limestone, which is considered to be more karstic than the dolostone found at Well 5. The capture zone for Well 7 includes substantial areas where the overburden is less than 10 m thick, and areas close

to Well 7 have overburden less than 3 m thick. The combined capture zone for Wells 6 and 7 may be as large as 500 hectares (2 square miles).

Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al (July 9, 2001), pages 37-38

125. Pumping tests conducted post-May 2000 at Well 7 revealed the presence of nitrates at levels higher than those recorded in Well 6. Elevated nitrate concentrations are indicative of surface water influence.

Ex. 256, Dr. Robert Gillham Power Point presentation, slide 11
Ex.259, Golder Associates Final Report (September 2000), Table XIII, page 2
Dr. Robert Gillham (March 1/01), pages 116-117

126. These pumping tests at Well 7 also caused a significant drawdown of the spring located between Wells 6 and 7. The results of the pumping test – and corresponding variations in electrical conductivity at the spring – demonstrate that the spring is well-connected to the aquifer that feeds Well 7.

Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et. al (July 9, 2001), page 30
Ex. 417, Dr. Stephen Worthington Power Point presentation, slide 30
Dr. Stephen Worthington (July 19/01), pages 49-52

127. In addition, daily turbidity readings for Well 7 in August and September 2000 shows a number of short-lived but sharp increases in turbidity, which correspond with similar turbidity spikes at Well 6 on the same dates. Such results suggest that Well 7 is subject to surface water influence, and further suggests that Well 6 and 7 are hydraulically connected.

Ex. 228, Appendix G, Interim Report on Walkerton Water Supply by R.V. Anderson Assoc. (Sept. 2000), pages 5-6, and Appendix C (Summary Lab Data)
Dr. Robert Gillham (March 1/01), page 169, lines 18-25

128. Spore-forming organisms have also been detected in raw water at Well 7, which is indicative of surface water influence since such organisms are not usually found in groundwater.

Garry Palmateer (Feb. 26/01), page 253, line 20-25; page 254, lines 1-12

129. The vulnerability of Well 7 to contamination is further demonstrated by post-May 2000 bacteriological sampling. In particular, from September to December 2000, an astounding 76% of samples detected the presence of

coliforms at Well 7. This situation has been characterized as "chronic contamination".

Ex. 416, Dr. Stephen Worthington Power Point presentation, slide 45A
Dr. Stephen Worthington (July 19/01), page 73-76
Dan Brown (July 19/01), page 175, lines 7-16

130. It has been speculated that a temporary submersible pump was the source of the above-noted coliform contamination of Well 7. However, there is no evidence supporting this theory, particularly since it is standard practice to disinfect pumps prior to installation. Moreover, this theory does not explain why coliform continued to be detected in Well 7 in the months after the temporary pump was removed. In fact, on the date that Dr. Stephen Worthington observed and photographed the spring near Well 7 reversing (eg. draining surface water into the aquifer), coliform was again detected in Well 7.

Dr. Stephen Worthington (July 19/01), page 77
Dan Brown (July 19/01), page 154-158
Dr. Robert Gillham (July 19/01), page 204-211
Ex. 417, Dr. Stephen Worthington Power Point presentation, Slide 32

131. The evidence and obervations of Dr. Stephen Worthington on this issue leads to two important conclusions: first, that Well 7 was (and is) vulnerable to contamination under low-flow conditions, when pumping at Well 7 can cause the spring to reverse and draw in surface water; and second, that Well 7 and Well 6 were unlikely to have caused or contributed to the May 2000 contamination since the April and May rainfall would have caused high flow rates out of the spring, meaning that well pumping would not have been able to reverse the spring.

Dr. Stephen Worthington (July 19/01), pages 63-64
Ex.416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), page 38
Ex. 417, Dr. Stephen Worthington Power Point presentation, Slide 45B

**e) Contamination of Well 5 in April and May 2000**

132. There is an "overwhelming" case that Well 5 was likely the sole well source of the contamination of Walkerton's water distribution system in May 2000.

Ex. 221, Municipality of Brockton: Contamination of Walkerton Water Supply - May Dr. Stephen Worthington (July 19/01), pages 133-134
Dan Brown (July 19/01), page 188
Dr. Robert Gillham (July 19/01), page 197-198
Dr. Andrea Ellis (Jan. 11/01), page 154-157

Ex. 228, Appendix A, GAP Report (Sept. 29/00), page 2
Ex. 422, Dr. Gillham Comments on the Karst Report (July 13/01), page 3

133. In order to assess how and why Well 5 became contaminated in May 2000, it is necessary to address two broad questions: (a) what were the potential pathways for E. coli bacteria to enter Well 5? and (b) were there any sources of E. coli bacteria in or around these potential pathways in May 2000?

134. To identify contamination pathways at Well 5, it is first necessary to delineate the catchment area for Well 5.

135. The surface catchment (direct runoff) area for the springs near Well 5 is approximately 2.0 hectares, which extends slightly into fields on the Biesenthal farm where manure was spread and/or cattle were present in April and May 2000 (see below). However, this small catchment area only contributes some 2% of the springs' discharge. Recharge from an adjoining 12 hectare area accounts for 14% of the springs' flow, and recharge from the larger Silver Creek catchment area accounts for 83% of the springs' flow. The entire spring catchment area is approximately 150 hectares (0.6 square miles).

Dr. Stephen Worthington (July 19/01), page 45 and 47
Ex. 417, Dr. Stephen Worthington's Power Point presentation, slides 23-26

136. Within this 150 hectare catchment area, the overburden is thin, fractured, and varies considerably over short distances, particularly near Well 5. In addition, there are deposits of gravel in the Well 5 catchment area, which can permit water to flow through the overburden. These facts, together with the karstic bedrock, provide pathways for bacteriological contamination to enter the groundwater and quickly travel to Well 5 and the nearby springs.

Dr. Stephen Worthington (July 19/01), page 72
Ex. 263, Quaternary Geology Map: Walkerton Kincardine Area
Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), pages 27-29 and 35-36
Ex. 417, Dr. Worthington Power Point presentation, slide 47

137. The presence of mottling in a monitoring borehole near the Beisenthal barn provides evidence of weathering caused by surface water flow through downward fractures. Travel time through these overburden fractures could be as short as hours or minutes.

Dr. Robert Gillham (March 1/01), pages 128-30
Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), pages 28-29

138. Once bacteriological contamination is present in the karst aquifer, it can travel to Well 5 or the nearby springs in a matter of days or less. Thus, bacteriogically contaminated water can be pumped at Well 5 before there has been significant die-off of the bacteria.

Ex.416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), pages 25 and 29
Dr. Robert Gillham (March 1/01), pages 128-30

139. Much of the groundwater flowing to the springs would be captured by Well 5 when it was pumping, with a higher proportion of capture during dry periods and relatively less during wet periods. Pumping tests and tracer tests conducted at Well 5 in August 2000 establish the direct connection between the springs and Well 5. Indeed, there is no doubt that Well 5 is under the influence of surface water.

Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et. al (July 9, 2001), pages 25 and 29
Dr. Robert Gillham (Feb. 28/01) pages 146-150

140. Given the catchment area for Well 5, it is possible that bacteriological contamination could originate several kilometres from Well 5. However, it is much more likely that the May 2000 E. coli contamination of Well 5 originated near the well. Subsequent environmental testing for E. coli sources within a 4 km zone around Well 5 confirms that the Beisenthal farm was the source of the May 2000 contamination of Well 5, as described below.

Dr. Stephen Worthington (July 19/01), page 82, 88-89
Ex. 417, Dr. Worthington Power Point presentation, slide 46

141. There appears to be a clear correlation between heavy rainfall events and bacteriological contamination at the Beisenthal well. This correlation is less apparent at Well 5 due to data limitations, but it does appear on the evidence at Wells 6 and 7. In addition, heavy rainfall events create changes in discharge rates and electrical conductivity at the springs near Well 5, providing further evidence of the aquifer's vulnerability to surface water influence.

Dr. Stephen Worthington (July 19/01), pages 119-120 and 194-195
Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), pages 13-18 and 20-21
Ex. 417, Dr. Stephen Worthington Power Point presentation, slides 22 and 42-43

142. The intense rainfall events in late April 2000 likely resulted in bacteria being leached downward through the overburden, transported through the karst aquifer and pumped at Well 5, thereby causing some of the initial illnesses reported by Dr. Pierre Payment for that timeframe. Similarly, heavy rainfall on May 1 and 8, 2000 likely saturated the ground, increased flow rates at the springs near Well 5, and bacteriologically contaminated Well 5. The intense rainfall of May 12, 2000 likely had the same effect, and resulted in the contamination of Well 5 within days (or even hours) of the rainfall event.

Steve Burns (Jan. 17/01), page 178
Dr. Pierre Payment (Feb. 28/01) at page 22-26 and page 45
Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), page 36
Ex. 254, Tab 2, Dr. Pierre Payment Power Point presentation, slides 14 and 28

143. The possibility of contaminated overland flow in May 2000 from the Beisenthal farm to Well 5 cannot be ignored or discounted as impossible. However, surface water flow patterns at the Beisenthal farm are southward, rather than towards the springs and Well 5.

Dr. Stephen Worthington (July 19/01), pages 69-70

144. In addition, surface water modelling has demonstrated that significant ponding would be necessary for a prolonged period of time upon the Beisenthal farm for overland flow to move towards Well 5 and the springs. There appears to be no evidence that such ponding occurred in May 2000.

Dr. Michael Goss (Feb. 27/01), pages 143 and 156
Ex. 416, *Karst Hydrogeological Investigations at Walkerton* by Worthington et al. (July 9, 2001), pages 36-37

145. Accordingly, the overland flow scenario is, at best, an improbable explanation for the contamination of Well 5 in May 2000.

Dr. Michael Goss (Feb. 27/01), pages 102
Ex. 256, Dr. Robert Gillham Power Point presentation, slide 30
Dr. Robert Gillham (Feb. 28/01), page 131-132; page 150; page 159
Dr. Robert Gillham (March 1/01), page 145-146 and pages 140-141
Dr. Stephen Worthington (July 19/01), page 42 and 44

146. Moreover, in light of heavy rainfall events in April and May 2000, the discharge of the karstic springs near Well 5 was greater than the maximum pumping rate at Well 5. For this reason, backflow of contaminated surface water through the spring was unlikely to have occurred in May 2000.

Ex. 417, Dr. Stephen Worthington Power Point presentation, slide 48
Dr. Stephen Worthington (July 19/01), page 48; page 56; pages 76-77

147. Similarly, it is unlikely that backflow of surface water occurred through the spring near Wells 6 and 7 in May 2000. Although this spring has been subsequently observed to reverse (eg., drain surface water into the aquifer) under low-flow conditions, the heavy rainfall events of April and May 2000 likely created considerable discharge from the spring. This factor allows Wells 6 and 7 to be ruled out as they were improbable sources of the contamination of Walkerton's water supply and distribution system in May 2000.

Dr. Stephen Worthington (July 19/01), pages 79-80
Ex. 417, Dr. Worthington Power Point presentation, slides 45A and 45B

148. Having established the existence of contamination pathways at Well 5, it then becomes necessary to determine if there were any known sources of E. coli within the Well 5 catchment area.

149. E. coli bacteria, campylobacter and other pathogens exist within various farm animals, particularly cattle, that are present in the Walkerton area. Once shed by these animals, such pathogens can persist in soil and water for prolonged periods of time (10 to 25 weeks for E. coli in soil).

Dr. Pierre Payment (Feb. 28/01), pages 50-55
Ex. 254, Tab 2, Dr. Pierre Payment Power Point presentation, slides 30-38

150. Spring rainfall events (such as May 8-12, 2000) provide favourable conditions for the survival and transport of pathogens to other locations. Pathogens can travel through cracks and fractures in the soil and bedrock to reach subsurface water. Once in cold subsurface water, pathogens can survive for several months.

Dr. Pierre Payment (Feb. 28/01), page 53, 98-99
Ex. 254, Tab 2, Dr. Pierre Payment Power Point presentation, slides 39, 72-73

151. If E. coli bacteria are transported into a source of drinking water, the bacteria can usually be easily disinfected through chlorination. However, E. colican evade treatment where excessive chlorine demand prevents the creation of an adequate free chlorine residual. This scenario occurs where a well (eg. Well 5) is under the influence of surface water.

Dr. Pierre Payment (Feb. 28/01), page 104, 121

Ex. 254, Tab 2, Dr. Pierre Payment Power Point presentation, slides 47, 54 and 60

152. Any E. coli bacteria that evade treatment can enter the water distribution system and survive for weeks, particularly if there is low (or no) free chlorine residual within the distribution system.

Dr. Pierre Payment (Feb. 28/01), page 102
Ex. 254, Tab 2, Dr. Pierre Payment Power Point presentation, slide 55

153. On the evidence, Well 5 was the most contaminated well in May 2000, and the occurrence of contamination is undoubtedly linked to the combination of unfortunate environmental conditions (eg., rain) and local surface contamination (eg., manure spreading and animal pasturing) in the Well 5 catchment area.

Dr. Pierre Payment (Feb. 28/01), page 22, 94 and 116-125
Ex. 254, Tab 2, Dr. Pierre Payment Power Point presentation, slide 60

154. A land use inventory for the area around Well 5 revealed the presence of a number of livestock operations, including the Beisenthal farm located in close proximity to Well 5. In contrast, no active livestock operations were identified within 1,000 metres of Well 6 and 7, although there appeared to be more distant potential sources of E. coli within the broader surface catchment area for Wells 6 and 7.

Ex. 221, *Municipality of Brockton: Contamination of Walkerton Water Supply May 2000 – Report on Cause* by B.M. Ross & Assoc. Ltd. (Oct. 3/00), pages 34 and 46-47

155. Manure spreading activity in late April 2000 at the Beisenthal farm is the most probable source of the Well 5 contamination in May 2000. Bacteria in manure spread in November 1999 would either be dead or would be highly stressed in low numbers by May 2000, and therefore is less conducive to infecting humans. Moreover, the size of the May 2000 outbreak indicates a relatively high level of contamination of active bacteria.

Dr. Pierre Payment (Feb. 28/01), page 94
Ex. 254, Tab 2, Dr. Pierre Payment Power Point presentation, slide 68

156. On the Biesenthal farm, all manure was removed from the barn area, and some 70 tons of manure spread on the front field (Lot 20) on April 20 or 22, 2000. This field is approximately 81 metres from Well 5. Corn planting commenced on or about April 28, 2000. Cattle were moved to a back pasture in early May 2000, although the cattle still came to the Biesenthal barn for water.

Ex. 265, S. Burns Memo: Meeting with Biesenthal Family (Aug. 2/00), page 2
Dr. Michael Goss (Feb. 27/01), page 82, 83, 85-88

157. Given that E. coli bacteria can survive in the environment for prolonged periods of time, most bacteria in the manure spread in late April 2000 in the front east field would still be viable and capable of infiltrating with rainfall through the soil.

Dr. Michael Goss (Feb. 27/01), page 61, 83, 143, 203

158. However, it is clear that Well 5 was already beginning to deteriorate from a water quality perspective in early April, prior to the spreading of manure at the Beisenthal farm.

Steve Burns (Jan. 17/01), page 178
Steve Burns (Jan. 18/01), pages 155-56
Ex. 221, *Municipality of Brockton: Contamination of Walkerton Water Supply – May 2000* by B.M. Ross & Assoc. Ltd. (Oct. 3/00), page 44

159. Moreover, it is highly improbable that a single animal was the only source of the Well 5 contamination. This is because multiple infections were observed in the Walkerton population in April and May 2000, thereby indicating that multiple pathogens were present in the water.

Dr. Pierre Payment (Feb. 28/01), pages 88-89
Ex. 254, Tab 2, Dr. Pierre Payment Power Point presentation, slide 62

160. Environmental investigations to identify the possible origin of these pathogens focused upon livestock farms and wildlife droppings within a 4 km radius of Wells 5, 6 and 7. Bacteria with potential to harm human health was found on 11 of 13 farms, but only 2 farms were found to contain E. coli 0157:H7 and campylobacter jejuni. Wildlife specimens were negative for these pathogens.

Ex. 203, *The Investigative Report on the Walkerton Outbreak of Waterborne Gastroenteritis: May-June 2000* by Bruce/Grey/Owen Sound Health Unit (Oct. 10/00), pages 46-48
Ex.210, Dr. Andrea Ellis Power Point presentation, slide 33
Dr. Andrea Ellis (Jan. 11/01), page

161. The 4 km study areas used by the environmental investigators roughly corresponds with the catchment areas for Wells 5, 6 and 7.

Dr. Stephen Worthington (July 19/01), page 62
Ex. 417, Dr. Stephen Worthington Power Point presentation, slide 36

162. Resampling at the Biesenthal farm on June 13, 2000 confirmed the presence of the same phage type of E. coli 0157:H7 and campylobacter jejuni that had been detected in Walkerton residents who fell ill in May 2000. These findings confirm that a potential reservoir of these pathogens was in the vicinity of Well 5 during the timeframe of the May 2000 outbreak.

Dr. Andrea Ellis (Jan. 11/01), pages 73-75
Ex. 210, Dr. Andrea Ellis Power Point presentation, slide 34
Ex. 203, *The Investigative Report on the Walkerton Outbreak of Waterborne Gastroenteritis: May-June 2000* by Bruce/Grey/Owen Sound Health Unit (Oct. 10/00), page 50 and 53

163. Bacteriological sampling indicates that fecal waste entered directly into the aquifer of Well 5, and did not carry any measurable soil or vegetation with it.

Ex. 228, Appendix A, GAP Report (Sept. 29/00), page 11

164. It appears that manure handling activities at the Beisenthal farm were consistent with normal agricultural practices. However, a convergence of unfortunate occurrences – the presence of E. coli 0157:H7 in the manure; the excessive rainfall events of late April, 2000 and early May 2000, along with those of May 9 to 15, 2000; the continued use of Well 5 despite its known vulnerability to surface water influence; and a very low chlorine residual in the distribution system – constitute the primary elements of the physical causes of the May 2000 outbreak.

Dr. Michael Goss (Feb. 27/01), page 75, 102
Ex. 221, *Municipality of Brockton: Contamination of the Walkerton Water Supply May 2000 – Report on Cause* by B.M. Ross and Assoc. Ltd.

**f) Summary of Findings Regarding the Vulnerability of Wells 5, 6 and 7**

On the basis of the foregoing evidence, the CWC submits that the following key findings should be made in relation to the vulnerability of Wells 5, 6 and 7 to contamination:

- Wells 5, 6 and 7 draw water from karst aquifers, which are characterized by rapid groundwater flow through solutionally enlarged fractures in the bedrock;

- Wells 5, 6 and 7 were all vulnerable to contamination prior to May 2000, and, in fact, clearly exhibited indications of surface water influence prior to May 2000;

- of the three wells, Well 5 was the most vulnerable to contamination due to the shallow aquifer, thin overburden and proximity to nearby agricultural operations;

- Well 5's vulnerability to contamination was known since 1978 when well testing revealed the presence of nitrates, indicating that the aquifer was under the influence of surface water;

- the E. coli bacteria that contaminated Well 5 likely originated from cattle manure stored and/or spread upon the nearby Beisenthal farm;

- the E. coli bacteria from the cattle manure likely entered the shallow aquifer by leaching downward through natural and/or man-made breaches in the thin overburden near Well 5, particularly during the heavy rainfall events of April and May 2000;

- once present in the aquifer, the E. coli bacteria likely arrived at Well 5 within days or hours, particularly as Well 5 was being pumped; and

- there is little evidence supporting the theory that E. coli bacteria entered Well 5 via overland flow from the Beisenthal farm into the well casing and/or the nearby springs.

### II.B.3 – Groundwater under the Influence of Surface Water

165. None of the wells at Walkerton were treated as having their source in groundwater under the influence of surface water. If they had been, additional requirements would have been imposed. There was neither filtration nor additional "barriers" adding to the protection of the drinking water supply.

Huck Feb. 28/01 196:20-22; 197:14-17; 198:17-24; 199:2-5
Carr May 10/01 62:20-25
Ethier Oct. 17/00 62:25-63:5
Budziakowski Nov. 7/00 256:25-247:14

166. There was no extra monitoring required of the Walkerton wells, for example for turbidity and no continuous chlorine analyzer that could show when chlorine demand was increased. The only way to ensure that the system had adequate disinfection residual at all times would have been to continuously monitor for chlorine residual levels. Walkerton PUC was not required by the MoE to use an automatic chlorine residual recorder. However the chlorination bulletin suggested doing so for "poor water quality", which was defined based on bacteriological results.

Ellis Jan. 11 96:20-97:3
Jenkins, Carr May 10/01 107:3-110:7
Carr May 10/01 65:17-66:14; 56:20 – 57:10

167. There was in general, a systematic and false sense of security in ground water supplies in Ontario, and this sense of security extended to the operators' opinion of the soundness of the ground water supply and a perceived lack of

risk to the community from that supply. For example, groundwater under the influence of surface water was understood to mean "direct" or "immediate" influence and if the influence was not immediate, the additional requirements for surface water supplies were not imposed.

Carr May 10/01 74:3-75:8; 163:20-24

168. There were no periodic reviews to reassess treatment needs for the source. For example, after 1994 when the concept of "groundwater under the influence of surface water" and guidelines thereto was introduced, there was no program of the MoE to consider whether existing well supplies were under the influence of surface water (and accordingly whether their Certificates of Approval should be altered).

Lachmaniuk May 10/01 187:13-189:22; 162:11-25

169. Even following the 2000 Drinking Water Standard, while there are some engineering reviews that will encompass source assessment and some consideration of groundwater under the influence of surface water, there is as yet no satisfactory definition of this term. Furthermore, there is no effort being made to characterize and protect or treat groundwater under the indirect influence of surface water.

Carr, Lachmaniuk May 10/01 178:13-179:4

170. There was no approvals follow-up after a Certificate of Approval was issued, unless a specific condition was imposed on the Certificate of Approval. For example, a requirement for additional monitoring and re-consideration of the appropriateness of the treatment could have been imposed at the time of the original approval, but was not.

Budziakowski Nov. 8/00 188:21-189:3
Carr May 10/01 75:9-77:15; 87:19-88:11; 180:17-183:1

**Recommendation: All municipal supplies should be re-assessed periodically as to their sources and catchment areas, and as to potential contamination of same, including assessment of whether a source considered to be groundwater is under the influence of surface water. The definition of the latter term should extend to include not only the immediate influence of surface water (in minutes or hours to days) but also indirect influence of surface water (in weeks to months), as well as sporadic or intermittent influence of surface water. The latter question must be answered based on a sufficient time frame for monitoring for such influence to encompass seasonal variation and extreme events.**

## II-C CONTAMINATION ENTERING THE DISTRIBUTION SYSTEM IN MAY 2000

### II.C.1 - Overview of Walkerton Distribution System

171. As of May 2000, Walkerton's water distribution system (as of May 2000) may be summarized as follows:

- the system included two standpipes to provide storage and pressure equalization;
- the standpipes' combined capacity is almost 3,000 cubic metres (20 hours' worth of reserve to meet Walkerton's daily water demand);
- there were approximately 41 km of distribution watermains (and associated hydrants and valves) of varying sizes, materials and vintage; and
- there were approximately 1,816 water service connections to serve Walkerton residents.

Ex. 5, Mark Ethier Power Point presentation
Mark Ethier (Oct. 17/00), page 38

172. In general terms, Walkerton's water distribution system was typical of communities of comparable size.

Mark Ethier (Oct. 17/00), page 13

173. In addition, by May 2000 the Walkerton PUC was also looking after two smaller water systems in Chepstow and Geeson Avenue. However, neither of these smaller systems were connected to the Walkerton distribution system.

Mark Ethier (Oct. 17/00), pages 17-18

174. A computerized SCADA system was used by the PUC to: (a) control and monitor the pumps at Wells 5, 6 and 7; (b) record flow data from Wells 5, 6 and 7; and (c) monitor and alarm standpipe water levels. However, the SCADA system did not provide continuous monitoring (or alarms) for chlorine residuals or water turbidity.

Ex. 5, Mark Ethier Power Point presentation

175. The MOE did not require the Walkerton PUC to use an automated chlorine residual recorder. However, the MOE's Chlorination Bulletin suggested do so for "poor water quality", which was defined on the basis of bacteriological results.

Carr (May 10/01), pages 56-57, 65-66

176. Most of Walkerton's watermains were at least 50 years old in May 2000, as 64% of the watermains were constructed prior to the 1950 (or were of unknown vintage). This percentage of older watermains seems high compared to other small communities. In addition, over half of Walkerton's watermains were 150 mm (6 ") or less in diameter, including a number of watermains that had been significantly encrusted by calcium deposits. Such encrustation not only reduces the diameter of the watermains, but it also restricts water flow, causes corrosion problems, and offers opportunities for bacterial growth within the distribution system.

Mark Ethier (Oct. 17/00), pages 48-49 and 76

177. In addition, approximately 80% of Walkerton's watermains consisted of iron pipe, which exerts greater chlorine demand.

Ex. 260, Dr. Peter Huck Power Point presentation, slide 51

178. Although Walkerton's wells were "looped" with the standpipes, the distribution system contained approximately 35 "dead ends", which can "trap" water and turn it stagnant over time. In addition, by May 2000 the distribution system contained a number of valves that were in need of repair or replacement.

Mark Ethier (Oct. 17/00), pages 15, 38-42 and 53

179. In May 2000, the Walkerton PUC lacked a hydraulic analysis for its water distribution system. Such an analysis identifies large demand points and actual flow patterns within a distribution system. In addition, such an analysis allows operators to optimize flushing of the distribution system.

Ed Houghton (Nov. 28/00), page 15-16

180. Walkerton's 5,000 residents typically used 3,500 cubic metres of water per day.

Mark Ethier (Oct. 17/00), page 17

181. Walkerton's water system usually exerted a high chlorine demand.

Steve Burns (Jan. 17/01), page 209

182. At all material times, the Walkerton water supply and distribution system was operated by the Walkerton PUC until the Ontario Clean Water Agency ("OCWA") was retained by the PUC on May 25, 2000 to operate (and upgrade) the system. After assuming operation of the Walkerton system,

OCWA undertook a number of remedial steps, including the installation of continuous monitoring equipment for chlorine residual and turbidity.

Ex. 5, Mark Ethier Power Point presentation
Mark Ethier (Oct. 17/00), page 84

### II.C.2 Pumping & Chlorination Data for Wells 5, 6 and 7

183. The chlorine residual levels recorded by PUC staff in the daily operating logs for Wells 5, 6 and 7 are inherently unreliable. As a matter of routine, the chlorine residual levels were not actually measured daily by PUC staff during pumphouse visits, and the corresponding entries in the operating logs were often fictitious. Even when PUC staff actually measured chlorine residuals at the pumphouses, the residual level was not recorded in the well logs in accordance with long-standing PUC staff practice.

Alan Buckle (Dec. 5/00), pages 28-33, 53-75 and 82
Frank Koebel (Dec. 6/00), page 197; pages 206-207
Frank Koebel (Dec. 7/00), page 35-39 and 46-48
Stan Koebel (Dec. 18/00), page 15 and 17
Stan Koebel (Dec. 19/00), pages 11-12; pages16-18 and 37-39

184. Similarly, the chlorine residuals found in the annual reports filed by the PUC with the MOE are also inaccurate and unreliable, primarily because they were derived from the fictitious entries in the daily operating logs for the three wells.

Stan Koebel (Dec. 19/00), page 38, 43, 52, 57-59
Frank Koebel (Dec. 7/00), pages 77-83

185. The difficulty in ascertaining actual chlorine residual levels prior to the long weekend in May 2000 is compounded by the fact that different PUC staff had varying views on the amount of chlorination required to disinfect Walkerton raw water supply. For example, Stan Koebel occasionally adjusted the chlorination control setting upward (eg., to just under 0.5), while Frank Koebel occasionally turned it down (eg., to 0.3).

Stan Koebel (Dec. 18/00), pages 72-74

186. In addition, prior to the long weekend in May 2000, none of Walkerton's three wells had an automatic chlorine residual analyzer in place. Stan Koebel was aware that automatic chlorine analyzer equipment was desirable, and the 1997 PUC budget allocated $6,000 towards the purchase of analyzer equipment. However, no such equipment was installed prior to the long weekend in May 2000.

Stan Koebel (Dec. 18/00), page 158, lines 3-20

187. Moreover, it appears that chlorine residual levels were not routinely measured within Walkerton's distribution system by PUC staff prior to May 2000.

Frank Koebel (Dec. 6/00), page 199
Frank Koebel (Dec. 7/00), page 14 and 46

188. Likewise, the pumping data recorded in the daily operating logs must also be viewed with considerable suspicion. For example, the daily well log sheets indicate that Well 5 was not active on May 11 to 14, 2000 when, in fact, the SCADA data confirms that Well 5 was in use during those days. Similarly, the daily well log sheet for Well 7 indicates that it was not active on May 8, 2000 when, in fact, the SCADA data confirms that Well 7 was in use that day (without a chlorinator).

Frank Koebel (Dec. 7/00), page 41; pages 96-101
Stan Koebel (Dec. 18/00), page 15-17 and 79-84
Ex. 149(B), Tab 4, May 2000 Sheet for Well 7

189. In light of the foregoing concerns about well log accuracy, it appears that the SCADA system data offers the most reliable evidence about which wells were in use in April and May 2000.

Ex. 221, Municipality of Brockton: Contamination of Walkerton Water Supply – May 2000 by. B.M. Ross & Assoc. Ltd. (Oct. 3/00), page 37
Ex. 203, The Investigative Report on the Walkerton Outbreak of Waterborne Gastroenteritis: May – June 2000 (Oct. 10/00) page 44

190. From March 10 to May 2, 2000 (approximately seven weeks), Well 7 was taken out of service, and Wells 5 and 6 were used to meet Walkerton's water demand. This practice was followed to give Wells 5 and 6 "a chance to run", and to keep their respective aquifers "open and clear".

Stan Koebel (Dec. 19/01), page 116-118

191. On May 2, 2000, Well 7 was brought back into service, and thereafter all three wells were to be used on rotating "duty" cycle in the following sequence: Well 7, Well 5 and Well 6. However, from May 2 to May 9, 2000, Well 6 was not utilized at all, although its chlorinator was in place and functional.

Stan Koebel (Dec. 19/01), page 117; pages 144-147

192. From May 5 to 15, 2000, Stan Koebel was away from Walkerton. Before his departure, PUC staff went to Well 7 on May 3rd and removed the chlorinator in order to install a new chlorinator. The job of installing the new chlorinator

had not been completed when Stan Koebel returned to work on May 15, 2000, and Well 7 had been operating during his absence without a chlorinator.

Stan Koebel (Dec. 19/01), pages 129-130 and 147-149

193. On May 15, 2000, Stan Koebel turned on Well 7 via the SCADA system. Despite knowing that Well 7 lacked a chlorinator at the time, Stan Koebel elected to keep Well 7 in service. At that time, the Walkerton PUC had no policy that prohibited the use of wells without chlorinators.

Stan Koebel (Dec. 18/00), pages 15-16
Stan Koebel (Dec. 19/00), page 159
Bob McKay (Dec. 4/00), pages 154-155

194. The new chlorinator that was being installed at Well 7 in May 2000 had, in fact, been received by the PUC in late 1998. Although it would only take three days to install the new chlorinator, PUC staff did not schedule any work time to replace the Well 7 chlorinator until May 2000. Even then, due to various interruptions and other PUC work priorities, the installation of the new chlorinator at Well 7 started on May 3rd but was not completed until May 19th.

Stan Koebel (Dec. 18/01), pages 70-84
Frank Koebel (Dec. 7/00), pages 89-91 and 215-216
Alan Buckle (Dec. 5/00), pages 98-99 and 101-103

195. Based on the available evidence, it is not possible to reliably estimate the level of chlorine demand exerted by the egress of contaminated water into the Walkerton water supply and distribution system in May 2000. Similarly, it is not possible to reliably establish the levels of disinfection achieved in May 2000. However, normal chlorine residuals in the distribution system were typically very low, and during the critical mid-May period, it is possible that no chlorine was being added.

Ex. 260, Dr. Peter Huck Power Point presentation, slide 70
Ex. 221 *Municipality of Brockton: Contamination of Walkerton Water Supply – May 2000* by B.M. Ross & Assoc. Ltd. (Oct. 3/00), page 42

196. A contaminated well, if operated, would distribute water throughout most of Walkerton's distribution system within one day.

Ex. 221, *Municipality of Brockton: Contamination of Walkerton Water Supply – May 2000* by B.M. Ross & Associates Limited

197. The effect of operating Well 7 without a chlorinator in early May 2000 (eg. May 3rd to 9th and May 15th to 19th) was to decrease the chlorine residual throughout Walkerton's water distribution system.

Frank Koebel (Dec. 7/00), page 87 and 99-101
Stan Koebel (Dec. 19/00), page 130 and 148-149

198. On May 9, 2000, Well 5 came into service, and remained in use until May 15, 2000. Well 7 stayed off from May 9 to May 15, 2000. Well 6 was only used briefly on one day (May 9th) during this timeframe. In addition, it appears that well 5 supplied most of the water into the distribution system from May 9 to 15, 2000.

Stan Koebel (Dec. 19/00), pages 150-153
Ex. 260, Dr. Peter Huck Power Point presentation, slide 40

199. After Well 7 had been turned back on by Stan Koebel on May 15, 2000, Well 7 continued to pump unchlorinated water into the Walkerton distribution system until May 19, 2000. Well 5 remained in use during this time, while Well 6 stayed off until May 23, 2000. During this timeframe, on average there was likely no chlorine residual in the distribution system.

Stan Koebel (Dec. 19/00), pages 157-159
Steve Burns (Jan. 18/01), pages 151- 152
Ex. 260, Dr. Peter Huck Power Point presentation, slides 56-57

200. Once Well 5 became contaminated in May 2000, chlorination was ineffective due to the following factors:

- the contaminant levels overwhelmed the ability of the Well 5 chlorination system to disinfect the raw water;
- excessive turbidity may also have reduced the effectiveness of the Well 5 chlorination system; and
- once the contaminants entered the distribution system via Well 5, the typical low background chlorine residual levels would be ineffective for disinfection purposes.

201. Ex. 221, *Municipality of Brockton: Contamination of Walkerton Water Supply – May 2000* by B.M. Ross & Assoc. Ltd. (Oct. 3/00), page 52

### II.C.3 May 2000 Monitoring (Contaminants, Turbidity, Chlorine Levels)

202. In May 2000, turbidity was not being monitored in the Walkerton's water supply or distribution system. This is significant because large amounts of turbidity entering the system can render the chlorine less effective (or

ineffective) in disnfecting pathogens. This is because the chlorine gets used up meeting the organic demand.

Carr (May 10/01), page 58, lines 10-25
Goff Jenkins (May 10/01), pages 60-61

203. With respect to bacteriological testing, it is difficult to place much weight on test results for raw and treated water samples purportedly taken by PUC staff from the wells and distribution system. For many years, it appears that PUC samples were not taken from the locations indicated on the sample label.

Alan Buckle (Dec. 5/00), pages 87-92
Frank Koebel (Dec. 6/00), page 159-164, 166
Stan Koebel (Dec. 18/00), page 14, 17 and 19-20
Stan Koebel (Dec. 19/00), pages 93-95

204. On or about May 5, 2000, the PUC's new testing laboratory (A & L) sent Stan Koebel a report indicating that a May 1st sample had tested positive for total coliform. Stan Koebel was aware that this result was an indicator of deteriorating water quality.

Stan Koebel (Dec. 19/00), pages 162-164

205. On Wednesday, May 17, 2000, both Robert Deakin and Stan Koebel agreed that, in a conversation that occurred between 8:30 a.m. and 9:30 a.m., A & L advised Stan Koebel by telephone that May 15th water samples taken from the Highway #9 construction had all "failed" (see below), and that the distribution samples from #7 treated, 125 Durham, and 902 Yonge Street were also all positive or had "failed".

Robert Deakin (Oct. 18/00), page 132:7-25; 123:4-124:20
Stan Koebel (Dec. 18/00), page – 10:22-11:20; Dec. 19/00 page 176-179; Dec. 20/00, page 9:25; page 15; page 20:19-23:6

206. The final results of the May 15th water samples from the distribution system were faxed to Stan Koebel by A & L in the afternoon on Wednesday 17th, 2000. (The Highway 9 hydrant results were faxed in the morning of that date; the other results were sent in the afternoon after colony count were completed.) The results were positive for E. coli and total coliform for a sample that purported to be from Well 7. In fact, this sample was likely taken from a tap at the PUC workshop, which is close to Well 5. Because water at the PUC workshop does not receive 15 minutes' chlorine contact time, samples taken at the workshop are not necessarily reflective of water quality or chlorine residual levels within the distribution system.

Robert Deakin (Oct. 18/00), pages 132:7-135:22

Ex. 182 (c), Certificates of Analysis for Walkerton Distribution Samples (May 16/00)
Stan Koebel (Dec. 18/00), page – 10:22-11:20; Dec. 19/00 page 176-179; Dec. 20/00, page 9:25; page 15; page 20:19-23:6
Bill Hutchinson (Nov. 9/00), p. 174-175

207. Stan Koebel claims to have first read the faxed results of the May 15th sampling when he was at his office around noon on Saturday morning (May 20th). However, on Friday, May 19th, Stan Koebel had already commenced extensive (and unprecedented) flushing and chlorination activities after he had received two telephone calls from local health unit officials (James Schmidt and Dave Patterson) regarding water quality and illness reported at a local school that same day. During these conversations, Stan Koebel advised the health unit officials that the water was "okay". Despite this unusual contact by the local health unit, Stan Koebel claims that he did not attempt on May 19th to look at the faxed results of the adverse test result for Well 7 "raw water".

Stan Koebel (Dec. 20/00), pages 43-48

208. Stan Koebel's evidence on when he first read the faxed May 15th sampling results is contradicted by Ed Houghton, who testified that Stan Koebel told him that he "glanced" at the fax on Friday, May 19th. Similarly, Stan Koebel's evidence is contradicted by the evidence of Mayor David Thomson, who testified that Stan Koebel told him that he had "reviewed" the fax on Friday, May 19th. In light of the unprecedented flushing that was commenced by Stan Koebel on Friday, May 19th, the CWC submits that the evidence of Ed Houghton and Mayor Thomson should be preferred and accepted on this key issue.

Ed Houghton (Nov. 28/00), page 22 lines 5-14
Mayor David Thomson (Nov 29/00), page 208 lines 21-25

209. Stan Koebel believed that A & L would fax the May 15th sampling results to the MOE, and that the MOE would immediately contact him about the results. However, these results were not provided by A & L to the MOE or the medical officer of health. Similarly, when Stan Koebel was contacted by the MOE's Spill Action Centre ("SAC") on May 20th and 21st, he did not disclose the results of the May 15th sampling to the SAC representative.

Stan Koebel (Dec. 20/00), page 90 lines 12; p.92 line 9; p.92 line 25; p.95 line 14
Robert Deakin (Oct. 18/00), page 124 line 21; p.125 line 4

210. In the evening of Friday, May 19th, Stan Koebel received a call at home from a representative of the Maple Villa retirement facility, who inquired about water quality. Stan Koebel told her the water was "okay".

Stan Koebel (Dec. 20/00), pages 49-51

211. Similarly, on May 20, 2000, Stan Koebel advised Dave Patterson of the local health unit that the water was "okay", that flushing was underway, and that chlorine residuals were up within the distribution system. However, he did not disclose the results of the May 15th sampling to Dave Patterson during their May 20th conversations.

Stan Koebel (Dec. 20/00), pages 51-55; p.95-97

212. Likewise, in the morning of Sunday, May 21, 2000, Stan Koebel received a call from Mayor David Thomson. Again, Stan Koebel advised him that the water was "okay", that flushing was underway, and that chlorine residuals were up within the distribution system. Again, Stan Koebel did not disclose the May 15th sampling results to Mayor Thomson during ther May 21st conversation.

Stan Koebel (Dec. 20/00), pages 98-99

213. Stan Koebel again spoke with Mayor Thomson in the evening of May 21, 2000, to discuss the boil water advisory that had been issued by Dr. Murray McQuigge earlier that day. Stan Koebel heard about the boil water advisory while listening to the radio in the afternoon of May 21, 2000. During his evening conversation with Mayor Thomson, Stan Koebel again failed to disclose the May 15th sampling results to him.

Stan Koebel (Dec. 20/00), page 101 line 20 - p.102 line 9

214. The extensive flushing activities undertaken by Stan Koebel on the long weekend in May 2000 withdrew large amounts of water from the two standpipes in Walkerton. This drawdown caused Well 5 to resume service on May 20th, and the well remained in use (cycling on and off) until May 21, 2000. Well 5 remained inactive on May 21st, then returned to service on May 22, 2000.

Stan Koebel (Dec. 20/00), pages 85-87

215. On Monday, May 22, 2000, Stan Koebel was contacted, and then visited, by John Earl of the MOE's Owen Sound office. During the visit by John Earl on May 22nd, Stan Koebel provided him with copies of the May 15th sampling results and the Well 5 and 6 daily log sheets. However, Stan Koebel did not

provide him with a copy of the Well 7 daily log sheets on the grounds that the sheets were a "mess" due to "bad" arithmetic.

Stan Koebel (Dec. 20/00), pages 114-116

216. Stan Koebel subsequently instructed Frank Koebel to "clean up" the Well 7 log sheets. Thereafter, Frank Koebel inserted false chlorine residual levels for Well 7 on May 11, 12, 13, and 18. As noted above, Well 7 was operated without a chlorinator on these dates. In addition, false entries were made in relation to the amount of chlorine used on or about these dates. Moreover, Stan Koebel's initials were placed in the log sheet on a date (May 13th) when Stan Koebel was away from Walkerton on holidays. A copy of the falsified Well 7 daily sheet was then provided to John Earl.

Stan Koebel (Dec. 20/00), pages 116-120; p.178-180
Frank Koebel (Dec. 6/00), pages 204-209
Frank Koebel (Dec. 7/00), pages 45-46

217. In the morning of Tuesday, May 23, 2000, Stan Koebel was telephoned by Dave Patterson of the local health unit. Dave Patterson advised Stan Koebel that the health unit's own water sampling (taken over the long weekend) had detected E. coli bacteria in Walkerton's distribution system. In turn, Stan Koebel disclosed the May 15th sampling results to Dave Patterson, and further disclosed the above-noted lapse in chlorination at Well 7. During this conversation, Stan Koebel speculated that the cause of the occurrence may have been backflow through a valve gate at Well 7. As a result of his conversation with Dave Patterson, Stan Koebel lost his long-standing belief that Walkerton's water supply was of good quality and required little chlorination.

Stan Koebel (Dec. 20/00), pages 120-129; p.146 lines 12-25

218. At all material times, the employees were of the view that any dosage of chorine would disinfect contaminants in the water and did not undertake any systematic monitoring for chlorine residue. In fact, the PUC staff consistently recorded false readings of chlorine residue for water supplied by well 5, 6 and 7 in the daily operation sheets and in the annual summary form submitted to the MoE, as described above.

S. Koebel, December 19, 2000, 45:6- 48:7; Exhibit 182-B, Annual Summary Treated Water and wastewater Flows, Turbidity and Disinfectant Residual at p.14, 20 and 22.
F. Koebel, December 6, 2000,184:12-184:15.
Exhibit 61-C

219. The Walkerton PUC staff were not aware of the difference between total chlorine and free chlorine.

S. Koebel, December 18, 2000, 159-160
F. Koebel, December 7, 2000, 49:21- 50:8
Buckle, December 5, 2000, 27:7 -27:9

220. The MOE inspectors had advised the Walkerton PUC in writing on numerous occasions that there should be a 0.5 chlorine residual in the distribution system and a fifteen minute chlorine contact time. However, because of complaints by residents about the amount of chlorine in the drinking water, the minimum chlorination level would typically be set by PUC staff below the MoE guideline.

S. Koebel, December 19, 2000, 5:10- 7:23; 11: 2-15:20;Exhibit 182-A, Tab 20, p.9;
S. Kobel, December 18, 2000, 73:5-74:22.

221. The Walkerton PUC staff were unaware of the impact of turbidity (or organic nitrogen) would have on the effectiveness of chlorininination despite being advised by the MoE of such impacts.

S. Koebel, December 18, 2000, 126:4-126:14
F. Koebel, December 7, 147:3-147:5

222. The mechanism traditionally used by PUC staff for testing chlorine residue was the chlormetric chlorine residual analyzer. In 1998, the Walkerton PUC acquired a HACH kit, which provided a digital reading of the chlorine residual. However, even after purchasing the HACH kit, the PUC staff consistently recorded the wrong readings. Acccording to staff, it was a long-standing practice to record the erroneous readings, as described above.

S. Koebel, December 19,2000; 76:20-81:12

223. In addition, PUC staff was not using the appropriate method to test for chlorine residual. One employee testified that chlorine residual was tested by simply checking the "bubble" on the chlorinator. The purpose of the bubble was to indicate whether chlorine was going into the system, but it was not intended to be used as a means of determining chlorine residual. Even after the HACH kit had been purchased, the PUC staff continued to rely on the bubble method to assess chlorine residue.

Alan Buckle, December 5, 2000 28:23-31; p.63: 12- 64:2.

224. MOE inspectors periodically advised the Walkerton PUC of a number of deficiencies in their sampling program. In particular, the MOE advised that a

total of 13 bacteriological samples had to be collected from the distribution system each month, yet the Walkerton PUC had historically up from the 1980s only taken between 2 to 4 samples each week.

Stan Koebel, December 19, 2000, 16:10- 16:25.

225. Furthermore, Walkerton PUC staff did not conduct any routine sampling for chlorine residual within the distribution system, as described above.

F. Koebel, December 7, 2000, 17: 47:23.

226. PUC employees who undertook sampling had received no formal training in sampling protocols. Moreover, PUC employees were unfamiliar with any MOE guidelines and procedures such as the Ontario Drinking Water Objectives or the Chlorination Bulletin 65-W-4.

S: Buckle, December 5, 2000,p.105: 8-25; p.129: 1 9-21: p.130: 1-11; p.131
F. Koebel, December 6, 2000, 141:4- 143:19

227. In fact, Mr. Buckle, who undertook water sampling at the Walkerton PUC, was unaware of the term “E. coli”. Mr. Buckle was of the view that chlorine was added to the water to remediate discolouration and odour, and to get rid of "bugs." He had no knowledge of what types of contaminants were being tested through sampling. Mr. Frank Koebel, the PUC foreman who was responsible for supervising Mr. Buckle and who also undertook bacteriological sampling, was unaware that E. coli in water was an indicator of "unsafe drinking water".

Alan Buckle (Dec. 5/01), pages 105, 217 and 230-231
F. Koebel. December 6,2000, 155:19-155:25
F. Koebel, December 6,2001, 32:21-31:24

### II.C.4 - Highway #9 Construction Project

228. In April and May 2000, the existing watermain on Highway #9 (south end of Walkerton between Circle Drive and Wallace Street) was upgraded to coincide with some reconstruction work in the area.

Dennis Elliot (Jan. 16/01), pages 72-73

229. By May 11, 2000, construction of the new watermain was substantially completed, after which time the gate valve was partially opened to allow the pipe to fill with water from the distribution system. On May 12, 2000, the new watermain was pressure-tested and appeared satisfactory. Disinfection procedures were then implemented by the contractor.

Dennis Elliot (Jan. 16/01) pages 95-110

230. On May 15, 2000, water samples were taken at the Highway #9 project, and were sent to the PUC's testing laboratory (A & L) together with the PUC's regular weekly water samples. The project's samples were marked as "rush".

Stan Koebel (Dec. 19/00), pages 167-168

231. On Wednesday, May 17, 2000, Stan Koebel spoke with Robert Deakin of A & L, who advised that all Highway #9 water samples had "failed" presence/absence testing for E. coli and total coliform. Robert Deakin further advised Stan Koebel that the regular water samples from Walkerton's distribution system also "didn't look good" at that point. A & L faxed Stan Koebel the results of those tests on that date; the hydrant results in the morning and the distribution results in the afternoon.

Robert Deakin (Oct. 18/00), pages 132:7-135:22
Ex. 182 (c), Certificates of Analysis for Walkerton Distribution Samples (May 16/00)
Stan Koebel (Dec. 18/00), page – 10:22-11:20; Dec. 19/00 page 176-179; Dec. 20/00, page 9:25; page 15; page 20:19-23:6

232. After the first set of adverse test results for the Highway #9 project, the contractor repeated disinfection procedures on May 17, 2000. On May 18, 2000, the contractor flushed the watermain again and took further water samples. On May 20, 2000, the contractor was notified that these samples, too, had failed. By this time, the only building connected to the new watermain was the Saugeen Fuel & Facility (former Canadian Tire store), which had been connected for fire protection purposes with the knowledge and consent of Frank Koebel.

Dennis Elliot (Jan. 16/01), pages 125-138, 144-148

233. However, based on the available evidence, it is unlikely that the bacteriological contamination of May 2000 entered the distribution system via the Highway #9 construction project. The adverse bacteriological samples taken at the project likely occurred because water entering from the distribution system was already contaminated by that time.

Ex. 221, *Municipality of Brockton: Contamination of Walkerton Water Supply May 2000 – Report on Cause* by B.M. Ross & Assoc. Ltd. (Oct. 3/00), pages 17, 19, 45 and Appendix B (Dillon Report on New Watermain Construction on Highway 9)
Ex. 260, Dr. Peter Huck Power Point presentation, slide 64

234. Moreover, the epidemiological evidence indicates that the illnesses suffered in Walkerton in May 2000 were widespread and likely involved exposures to pathogens within the entire distribution system, not just a localized section of watermain.

Ex. 203, *The Investigative Report on the Walkerton Outbreak of Waterborne Gastroenteritis May-June 2000* by Bruce/Grey/Owen Sound Health Unit (Oct. 10/00), page 19
Ex. 210, Dr. Andrea Ellis Power Point presentation, slide 16
Dr. Andrea Ellis (Jan. 11/01), page 34 lines 10-17; p.216 line 20; p.219 line3

## II.C.5 - Summary of Findings Regarding Contamination of the Distribution System

389. On the basis of the foregoing evidence, the CWC submits that the following key findings should be made in relation to the contamination of Walkerton's water supply and distribution system in April and May 2000:

- Wells 6 and 7 are unlikely to have caused or contributed to the bacteriological contamination of the Walkerton distribution system in May 2000;
- on the preponderance of evidence, there is an "overwhelming" case that Well 5 was the sole source of the bacteriological contamination of the Walkerton distribution system in May 2000;
- once significant amounts of E. coli bacteria contaminated Well 5's raw water supply, the chlorination system at Well 5 was overwhelmed due to excessive chlorine demand;
- the contaminated Well 5 water was pumped into the distribution system which had been receiving unchlorinated Well 7 water for much of May 2000;
- the pumping of unchlorinated Well 7 water decreased the chlorine residual within the distribution system, which meant that the system was incapable of disinfecting the contaminated Well 5 water; and
- the Highway #9 construction project was a symptom, not a cause, of the widespread contamination of Walkerton's distribution system in May 2000.

## II.D. OVERSIGHT OF DRINKING WATER QUALITY

## II.D.1 - Walkerton PUC

390. In this section CWC reviews the agencies with primary responsibility for oversight of the Walkerton water supply. These include the Walkerton PUC, the Municipality of Brockton, the Bruce Grey Owen Sound Health Unit and the Ministry of the Environment. CWC makes submissions as to findings regarding how each agency carried out its oversight responsibilities and recommendations regarding same.

### a) Overview

391. In May 2000, water services were being provided by the Walkerton PUC, while wastewater services were being provided by the Town of Brockton. In May 2000, the Walkerton PUC also provided electrical services to Town residents.

Ex. 5, Mark Ethier Power Point presentation

235. In May 2000, approximately 5,000 Walkerton residents were being provided water by the Walkerton PUC via some 1,816 service connections.

Ex. 5, Mark Ethier Power Point presentation

236. Pursuant to the *Public Utilities Act*, a municipality may establish a PUC to control and manage its public utilities, such as water services. Accordingly, the Walkerton PUC was established by the Town of Walkerton through the requisite by-law, and been in operation for almost 50 years by May 2000.

*Public Utilities Act*, R.S.O. 1990, c.P.52, section 38(1)
Ex. 360, Walkerton By-law establishing Walkerton PUC
Mayor David Thomson (Nov. 29/00), page 160

237. Once established, only the Walkerton PUC – not the Town -- was statutorily empowered to exercise "all powers, rights, authorities and privileges" regarding PUC affairs.

*Public Utilities Act*, R.S.O. 1990, c.P.52, section 41(1)

238. However, the Town Council still retained jurisdiction over certain fiscal matters, such as PUC debentures or borrowing, as described below.

*Public Utilities Act*, R.S.O. 1990, c.P.52, section 41(4)

### b) PUC Commissioners

239. At all material times, the Walkerton PUC was headed by three elected officals. As head of council, the Mayor of Walkerton [later Brockton] was an *ex officio* member of the PUC Commission by virtue of section 42(1) of the *Public Utilities Act*. The other two members of the PUC Commission were elected by Walkerton voters during regular municipal elections.

*Public Utilities Act*, R.S.O. 1990, c.P.52, section 42(1)

240. In May 2000, Mayor David Thomson served as an *ex officio* member of the Walkerton PUC, while Jim Kieffer and Richard Field served as the elected members of the Commission.

Jim Kieffer (Nov. 16/00), pages 10-12
Richard Field (Nov. 27/00), pages 8-9
Mayor David Thomson (Nov. 29/00), page 78

241. As an *ex officio* member of the Walkerton PUC Commission, Mayor David Thomson nevertheless had the same duties, roles and responsibilities as the elected Commissioners. In addition, as the *ex officio* member, Mayor David Thomson played an important liaison role between the Walkerton PUC and the Town Council.

Mayor David Thomson (Nov. 29/00), pages 79-80
James Bolden (Nov. 28/00), page 213
Kent Edwards (June 5/01), pages 40-42

242. When he first became Mayor (and *ex officio* member of the PUC Commission), Mayor David Thomson knew little about Walkerton's water supply and distribution system. Upon taking office, he did not request to see the most current MOE inspection report, nor did he tour the PUC facilities, to get updated on the state of the waterworks.

Mayor David Thomson (Nov. 29/00), pages 83, 122
Mayor David Thomson (Nov. 30/00), pages 92-93

243. Prior to May 2000, Jim Kieffer had served on the PUC Commission for approximately 10 years, and he had become the Chair in 1992. Richard Field first served as a PUC Commissioner in 1997, then served a second term from 1998 to November 2000.

Jim Kieffer (Nov. 16/00), pages 10-12
Richard Field (Nov. 27/00), pages 8-9

244. The highest and most important duty of a PUC Commissioner was to ensure that drinking water being delivered to Walkerton residents was clean and safe.

Public safety is the highest priority regardless of whether the Commissioner is an elected or *ex officio* member.

Jim Kieffer (Nov. 16/00), page 202
Richard Field (Nov. 27/00), page 89
Mayor David Thomson (Nov. 30/00), page 72

245. However, Walkerton PUC Commissioners were not provided with sufficient educational materials that outlined their duties, roles and responsibilities, particularly with respect to water services. For example, while Richard Field and Jim Kieffer received a handbook prepared by the Municipal Electrical Association ("MEA"), it contained only general advice and was primarily geared to electrical services, not water services. No other policy manual or orientation handbook was distributed to the PUC Commissioners, especially in relation to water issues.

Janice Hallahan (Nov. 15/00), pages 237-39
Jim Kieffer (Nov. 16/00), pages 14-15
Richard Field (Nov. 27/00), pages 12-13
Ex. 113, MEA Handbook

246. Significantly, neither Jim Kieffer nor Richard Field nor Mayor David Thomson ever read the *Public Utilities Act* prior to May 2000.

Jim Kieffer (Nov. 16/00), page 13
Richard Field (Nov. 27/00), pages 16, 95
Mayor David Thomson (Nov. 29/00), page 82

247. Similarly, neither Jim Kieffer nor Richard Field nor Mayor David Thomson read the Ontario Drinking Water Objectives or the MOE's Chlorination Bulletin prior to May 2000.

Jim Kieffer (Nov. 16/00), page 20
Richard Field (Nov. 27/00), page 71-72
Mayor David Thomson (Nov. 29/00), page 83

248. Furthermore, Richard Field was not aware of the 1992 "Needs Study" (prepared by B.M. Ross for the Walkerton PUC), which identified and prioritized waterworks projects that were needed by the Walkerton PUC.

Richard Field (Nov. 27/00), page 33

249. During his term on the Walkerton PUC prior to May 2000, Richard Field did not know what was meant by the terms "E. coli" or "chlorine residual". Similarly, Jim Kieffer did not know what was meant by "E. coli", "chlorine residual" or "turbidity" prior to May 2000.

Richard Field (Nov. 27/00), pages 37, 75
Jim Kieffer (Nov. 16/00), pages 91, 113, 123

250. Despite being on the PUC Commission for a decade, Jim Kieffer did not know if the PUC had a contingency plan, nor did he know much about the Town's emergency plan.

Jim Kieffer (Nov. 16/00), pages 133, 280

251. Over the years, Walkerton PUC Commissioners only infrequently attended the various annual conferences and conventions held by waterworks industry associations.

Jim Kieffer (Nov 16/00), pages 134, 169
Richard Field (Nov. 27/00), pages 66-70
Mayor David Thomson (Nov. 29/00), pages 147-48

252. Moreover, Walkerton PUC Commissioners rarely, if ever, attended at the PUC office to obtain documents, review files, or ask questions of the PUC manager or staff.

Janice Hallahan (Nov. 15/00), pages 240-43
Richard Field (Nov. 27/00), page 91

253. The Walkerton PUC Commission would meet monthly to review and discuss matters arising in relation to water and electrical services. At such meetings, Stan Koebel would usually provide brief written "Manager's Reports", as well as copies of certain correspondence or mailings received by the PUC.

Jim Kieffer (Nov. 16/00), pages 25-27
Richard Field (Nov. 27/00), pages 17-18, 21
Janice Hallahan (Nov. 15/00), page 52

254. In recent years, much of the discussion at the monthly meetings of the Walkerton PUC Commission focused on fiscal and planning matters, especially with respect to electrical services in the context of Bill 35 (see below). Indeed, Richard Field believed that his job was primarily financial in nature. Similarly, Jim Kieffer believed that his job was primarily administrative in nature.

Richard Field (Nov. 27/01), pages 22, 96
Jim Kieffer (Nov. 16/00), pages 167, 190

255. At the monthly PUC meetings, water quantity issues (e.g. water usage, watermain breaks, new service connections, etc.) were occasionally discussed,

but water quality was not a mandatory agenda item and was not generally discussed at the monthly PUC meetings prior to May 2000. During Jim Kieffer's ten year tenure on the PUC, the only times that water quality was even mentioned was when the PUC received the 1996 and 1998 MOE inspection reports.

Janice Hallahan (Nov. 15/00), pages 53-56, 246
Richard Field (Nov. 27/00), pages 38, 72-73, 93
Jim Kieffer (Nov. 16/00), pages 27-28

256. As described below, it appears that Walkerton PUC Commissioners did not discuss employee training (or record-keeping) required by O.Reg. 435/93, nor did the Walkerton PUC have a policy regarding employee training.

O.Reg. 435/93, section 17
Jim Kieffer (Nov. 16/00), page 163

257. Similarly, PUC Commissioners did not discuss Well 5's vulnerability to surface water influence, nor was there discussion of the need for a buffer zone around Well 5.

Jim Kieffer (Nov. 6/00), pages 33-34, 175-76
Richard Field (Nov. 27/00), page 91
Mayor David Thomson (Nov. 29/00), page 125

258. At their monthly meetings, PUC Commissioners were not informed about the results of the PUC's weekly water sampling program. At the same time, it appears that PUC Commissioners did not inquire about sampling results. Moreover, while the Commissioners would have expected Stan Koebel to bring adverse sampling results to their attention, there was no PUC policy or procedure that required him to do so.

Richard Field (Nov. 27/00), page 92-93
Mayor David Thomson (Nov. 29/00), pages 109-110, 147
Mayor David Thomson (Nov. 30/00), page 65

259. In any event, the 1998 MOE Inspection report (which included discussion of adverse sampling results, including E. coli) was received and discussed by the Walkerton PUC Commissioners. The cover letter by Phil Bye that accompanied the Zillinger report was also received and reviewed by the PUC Commissioners. However, PUC Commissioners posed no questions to Stan Koebel regarding the MOE's findings in relation to E. coli found at Well 5 and the distribution system.

Richard Field (Nov. 27/00), pages 93-94
Jim Kieffer (Nov. 16/00), pages 128-31,180-81

260. Significantly, there were no inquiries or followup activities by Walkerton PUC Commissioners to ensure that Stan Koebel actually implemented the action plan to address MOE findings and recommendations in the 1998 inspection report.

Jim Kieffer (Nov. 16/00), page 198-99, 214-15
Richard Field (Nov. 27/00), page 94

261. Having regard for the foregoing evidence, the CWC submits that, in the circumstances, Mayor David Thomson, Jim Kieffer, and Richard Field failed to properly discharge their duties, roles and responsibilities in overseeing the management and operation of the Walkerton PUC. Indeed, during the very height of the Walkerton Tragedy, Mayor David Thomson failed or refused to attend any more PUC Commission meetings, despite the fact that he was still an *ex officio* member.

Mayor David Thomson (Nov. 30/00), page 64

262. In order to properly discharge their duties, roles and responsibilities as PUC Commissioners, it was not necessary for Mayor David Thomson, Richard Field or Jim Kieffer to have detailed knowledge of all technical aspects of public water supply and distribution.

Ed Houghton (November 28/00), page 94-95

263. However, in the circumstances, it was incumbent upon these Commissioners to generally acquaint themselves with all relevant laws, regulations and policies in order to ensure a safe water supply. In addition, it would have been reasonable for these Commissioners to attend conferences and read educational materials on drinking water matters (eg. waterborne pathogens, chlorination, etc.). More importantly, it was imperative that these Commissioners undertake meaningful follow-up with the PUC manager to ensure that MOE findings and recommendations were being fully addressed in a timely manner.

Kent Edwards (June 5/01), pages 24-26, 34-36, 45-47, 82-83
Ex. 351(a), Tab 9, OMWA Brief on Water Commissioners

264. Without such knowledge and follow-up activities, the CWC submits that the PUC Commissioners were manifestly unable to exercise the requisite degree of oversight over PUC management and operations. Among other things, meaningful and informed oversight by the PUC Commissioners would have facilitated greater accountability and responsibility by PUC employees, including Stan Koebel.

265. In summary, the CWS submits that the attitude and approach of the PUC Commissioners to their duties, roles and responsibility can be fairly characterized as unreasonable indifference at best, or benign neglect at worst. On the evidence, it is clear that the Commissioners failed to exercise due care and skill as overseers and "directing minds" of PUC operations.

**c) PUC Staffing, Licencing and Operations**

266. From the perspective of the PUC Commissioners, it was believed that the PUC was adequately staffed on the water services side, and was not operated on a "shoestring" budget. At the same time, Richard Field testified that the PUC Commissioners tried to keep staffing levels "as low as we could" in order to keep overall costs down.

Jim Kieffer (Nov. 16/00), pages 40-41
Richard Field (Nov. 27/00), pages 55, 90

267. On the water services side, in May 2000 PUC staffing consisted of the Manager (Stan Koebel), Foreman (Frank Koebel), two front-line employees (Alan Buckle, Bob McKay), and administrative/support staff. Richard Field recalled no requests for additional staff (other than Bob McKay) coming to the PUC Commission.

Frank Koebel (Dec. 6/01), pages 89, 110
Stan Koebel (Dec. 18/00), page 9
Richard Field (Nov. 27/00), pages 45-50

268. In May 2000, Stan Koebel was certified as a Class III waterworks operator. This certification was obtained through grandfathering provisions, rather through taking courses and passing exams.

Stan Koebel (Dec. 18/00), pages 66-68

269. By May 2000, Stan Koebel had worked for the Walkerton PUC in various positions, and he became the PUC Manager in 1988. As PUC Manager, Stan Koebel only spent 10 to 15% of his time on water services, and the remaining 80 to 85% of his time was spent on electrical matters.

Stan Koebel (Dec. 18/00), page 33

270. As PUC Manager, Stan Koebel believed that Walkerton's water supply was safe, particularly since some chlorine was being added to raw water at the supply wells.

Stan Koebel (Dec. 18/00), pages 68-69
Stan Koebel (Dec. 19/00), page 83

271. As PUC Manager, Stan Koebel had not read the Ontario Drinking Water Objectives prior to May 2000, but he did read certain portions of the MOE's Chlorination Bulletin. However, Stan Koebel was unaware what was meant by the terms "turbidity", "organic nitrogen", "free, total or combined chlorine", or "E. coli".

Stan Koebel (Dec. 18/00), pages 111, 114-15, 130-32, 159-60, 176-77

272. As the PUC Manager, Stan Koebel believed that it was the testing laboratory's responsibility to notify the MOE of adverse test results.

Stan Koebel (Dec. 18/00), pages 11-12

273. There was no job description for Stan Koebel's position as PUC Manager. As the employer of Stan Koebel, the Walkerton PUC Commission was responsible for supervising his job performance.

Stan Koebel (Dec. 18/00), page 85
Richard Field (Nov. 27/00), page 16
Jim Kieffer (Nov. 16/00), page 37

274. Over the years, Stan Koebel accumulated almost 100 days of vacation days, which would cause a hardship on PUC operations if he attempted to take these days off. This situation prompted some concern and discussion among PUC Commissioners in April 2000, but little appears to have been done to alleviate this situation prior to May 2000.

Richard Field (Nov. 27/00), pages 57-58
Mayor David Thomson (Nov. 29/00), pages 141-42
Mayor David Thomson (Nov. 30/00), pages 59-60

275. In May 2000, Frank Koebel was certified as a Class III waterworks operator. This certification had been obtained through grandfathering provisions, rather than by taking courses and passing exams. In fact, Frank Koebel had not taken a single waterworks course during his tenure at the Walkerton PUC.

Frank Koebel (Dec. 6/00), pages 92-93

276. Frank Koebel had been employed by the Walkerton PUC since 1975. In 1988, Frank Koebel became the PUC Foreman, and Stan Koebel became the PUC Manager. As his brother, PUC Manager Stan Koebel occasionally found it difficult to supervise and/or discipline Frank Koebel.

Frank Koebel (Dec. 6/00), pages 88-89

Stan Koebel (Dec. 19/00), page 113-14

277. After becoming PUC Foreman, Frank Koebel spent about 75% of his time on hydro matters and 25% on water matters by May 2000

278. Frank Koebel (Dec. 6/00), page 118

279. When Stan Koebel was away from Walkerton, Frank Koebel was in charge of the "outside" PUC staff.

Stan Koebel (Dec. 19/00), page 121

280. As PUC Foreman, it was Frank Koebel's belief that Walkerton's water supply did not require much or any chlorination, and that chlorination was merely a MOE recommendation, not a requirement. Frank Koebel had never reviewed the Ontario Drinking Water Objectives or the MOE's Chlorination Bulletin, and was unaware of what was meant by the terms "organic nitrogen", "nitrates", "turbidity" or "chlorine demand".

Frank Koebel (Dec. 6/00), pages 120, 141-43

281. From time to time, Frank Koebel was aware of water sample results indicating the presence of E. coli bacteria and coliforms at Well 5, but subsequent resampling invariably failed to find such contaminants. Frank Koebel was unaware that E. coli was an indicator of unsafe drinking water.

Frank Koebel (Dec. 6/00), pages 123, 155-56
Frank Koebel (Dec. 7/00), page 8

282. Stan Koebel did not review or discuss the 1996 and 1998 MOE inspection reports with Frank Koebel. However, the 1992 MOE inspection report was reviewed with Frank Koebel by Stan Koebel, who indicated that the MOE simply wanted more sampling and a higher chlorine residual.

Frank Koebel (Dec. 6/00), pages 136-37
Frank Koebel (Dec. 7/00), pages 8-9

283. During his employment at the Walkerton PUC, Bob McKay was unaware of any operational manuals, contingency plans or notification procedures in the event of problems with the waterworks. Similarly, Alan Buckle was unaware of any guidance manuals or books that would have assisted him while working on the water side of the Walkerton PUC.

Bob McKay (Dec. 4/00), pages 152-53
Alan Buckle (Dec.5/00), page 131-32

284. In contrast, the nearby Town of Collingwood has established notification protocols for waterworks staff to follow in the event of adverse water samples.

Ed Houghton (Nov. 28/00), pages 96-99

285. From time to time, PUC staff consumed alcohol while on the job, and beer was kept in the PUC workshop fridge, until Stan Koebel put an end to this practice.

Stan Koebel (Dec. 19/01), page 114

286. From 1975 to May 2000, the Walkerton PUC undertook no systematic swabbing of Walkerton's watermains.

Frank Koebel (Dec. 6/00), page 132

287. As described above, the PUC manager and staff knowingly undertook a number of clearly inappropriate (if not unsafe) water-related practices prior to and during May 2000, including:

- failing to properly take or record chlorine residual levels;
- submitting false information regarding chlorine residuals to the MOE;
- falsifying daily operating sheets;
- using uncertified PUC staff to undertake critical water-related tasks;
- operating supply wells without chlorinators for prolonged periods of time;
- failure to install dual (or back up) chlorinators at all supply wells; and
- switching in April 2000 to a private laboratory that was uncertified to perform bacteriological testing.

288. In April and May 2000, the Walkerton PUC had numerous projects on the go, but was short-staffed for various reasons.

Stan Koebel (Dec. 19/00), pages 111-14
Stan Koebel (Dec. 20/00), page 127

**d) PUC Training and Record-Keeping**

289. The Walkerton PUC was responsible for ensuring that the operators of its facilities received at least 40 hours of training per year. However, Richard

Field was unaware of whether PUC employees participated in training courses, nor does he recall any discussion about employee training. Similarly, Secretary-Treasurer Janice Hallahan was unaware of any PUC employees (aside from Stan Koebel) from the water side who took any training during her tenure at the Walkerton PUC.

O.Reg.435/93, section 17(1)
Richard Field (Nov. 27/00), pages 47, 52, 90
Jim Kieffer (Nov. 16/00), pages 134, 206
Janice Hallahan (Nov. 15/00) pages 47, 239-40

290. The Walkerton PUC was also required to keep records to verify that its facility operators received the prescribed training. However, it appears that no such records were kept by the PUC, which was flagged as a deficiency in MOE inspection reports in 1996 and 1998.

O.Reg.435/93, section 17(3)
Ex. 56, Tab 29, MOE Inspection Report by D. Apfelbeck (Jan. 1996)
Ex. 182, Tab 23, MOE Inspection Report by M. Zillinger (Feb. 1998)
Jim Kieffer (Nov. 16/00), page 163

291. While employed at the Walkerton PUC, Bob McKay was never directed or encouraged to take additional training or courses. His Class I certification had been obtained through grandfathering, although by May 2000 he was in the process of studying for a certification exam.

Bob McKay (Dec. 4/00), pages 11-12, 16-17, 19

292. While employed at the Walkerton PUC, Alan Buckle spent approximately 65% of his work time on water services. However, Alan Buckle lacked any waterworks licensing or certification, and he undertook certain activities (e.g. water sampling and record-keeping) that should have been undertaken by properly certified PUC staff.

Alan Buckle (Dec. 5/00), pages 12-13, 16, 177-79

293. Given that the PUC was periodically short-staffed, it was difficult to send any employees off for training courses.

Stan Koebel (Dec. 20/00), page 158

294. There was generally no discussion between PUC management and employees in relation to drinking water quality.

Alan Buckle (Dec. 5/00), page 93

295. In contrast, the nearby Town of Collingwood has established internal and external training programs for its waterworks employees.

Ed Houghton (Nov. 28/00), pages 48-50

**e) PUC Budgets, Reserves and Planning**

296. Proposed PUC annual budgets would be prepared and presented by Stan Koebel and Janice Hallahan to the PUC Commission, which then reviewed and approved the budgets.

Janice Hallahan (Nov. 15/00), pages 16-17
Jim Kieffer (Nov.16/00), pages 28-29

297. Stan Koebel attempted to keep water rates low in the proposed budgets in order to avoid having the Commission reject the budget.

Stan Koebel (Dec. 18/00), pages 88-91

298. While there was no explicit PUC policy or mandate to keep water rates as low as possible, the fact is that Walkerton consistently had the lowest rates among area municipalities.

Janice Hallahan (Nov. 15/00), pages 42-44
Richard Field (Nov. 27/00), page 39-41
Ex. 105, Hallahan Book of Documents, Tab 6, Water Rate Comparisons

299. Stan Koebel advocated metering the PUC's water customers, but the PUC Commission opted for flat rates.

Stan Koebel (Dec. 18/00), pages 91-92

300. After PUC budgets were passed by the Commission, they would be forwarded to Town council for review and approval, as described below.

Richard Field (Nov. 27/00), page 31
Janice Hallahan (Nov. 15/00), pages 28-30

301. Funds accumulating in the PUC reserves would often be earmarked for specified projects, such as watermain construction. Even large capital projects would generally be funded from reserves in order to avoid PUC borrowing.

Richard Field (Nov. 27/00), page 44
Jim Kieffer (Nov. 16/00), page 73

302. By the end of 1999, the Walkerton PUC had sizeable reserves in the amount of $347,000 for various large projects that were looming in the near-future. However, the fact that funds were set aside for a particular project (e.g. Well 5 refurbishing) was no guarantee that the work would actually be done within that fiscal year. Not even the 1998 MOE report (which identified E. coli in samples from Well 5) prompted the Walkerton PUC to immediately spend money on Well 5 refurbishing, although Well 5 funds were already in the PUC reserves.

Jim Kieffer (Nov. 16/00), page 41-43, 86-87
Richard Field (Nov. 27/00), pages 42-43

**f) Impact of Bill 35**

303. From the perspective of the PUC Commissioners, the electrical restructuring mandated by Bill 35 occupied at least 75% (or more) of their time in 1999 and 2000.

Richard Field (Nov. 27/00), page 22
Jim Kieffer (Nov. 16/00), pages 34-35
Mayor David Thomson (Nov. 29/00), page 124
Mayor David Thomson (Nov. 30/00), page 167

304. From the perspective of the PUC Manager and Secretary-Treasurer, electrical restructuring occupied considerable time and resources in 1999 and 2000. In fact, only 5% of Stan Koebel's time was spent on water matters after Bill 35 was unveiled with a tight timeframe.

Stan Koebel (Dec. 18/00), page 101
Janice Hallahan (Nov. 15/00), pages 11-12

305. Bill 35 also created considerable uncertainty among PUC staff, particularly in relation to their job security.

Frank Koebel (Dec. 7/00), pages 61-62

**g) Summary of Key Findings Regarding PUC Management and Operations**

Virtually every PUC Commissioner and employee has testified that the Walkerton PUC was a "well-run" operation. However, the CWC submits that the available evidence points to the contrary conclusion, *viz.* that the Walkerton PUC was haphazardly managed and poorly operated prior to and during May 2000. In particular, the evidence supports the following findings:

- prior to and during May 2000, the PUC Commisssioners exercised ineffective supervision over the management and operations of the PUC;

- the Walkerton PUC failed to comply with the training and record-keeping requirements of O.Reg. 435/93;

- the PUC manager and staff routinely engaged in a series of deceptive and/or unsafe water-related practices;

- the foregoing litany of problems was compounded by Bill 35, which clearly diverted PUC time and resources from the water side to the electrical side.

## II.D.2 - Town of Brockton

### a) Overview

306. By May 2000, the former Town of Walkerton had amalgamated with two other local municipalities (Townships of Brant and Greenock) to form the new Town of Brockton. This amalgamation occurred in January 1998.

Mayor David Thomson (Nov. 29/00), pages 65-66
Ex. 124, Tab 1, Restructuring Order

307. During the amalgamation exercise, there was very little discussion of the fate of the Walkerton PUC. Similarly, there was no consideration of contracting out water services to OCWA.

James Bolden (Nov. 29/00), pages 24-26
Mayor David Thomson (Nov. 29/00), pages 68-70, 74

308. Since the Walkerton PUC served only the residents of Walkerton Ward in the new Town of Brockton, it was decided that Walkerton PUC should be retained to provide water services, rather than have such services assumed by the new Town.

Mayor David Thomson (Nov. 29/00), pages 68-70

309. The overall mandate of the Town (and its Mayor and Council) is to serve the residents and protect their health and safety.

Mayor David Thomson (Nov. 30/00), page 72
Richard Radford (June 5/01), pages 214-15

### b) Relationship with Walkerton PUC

310. In essence, the Town owned the waterworks, and the PUC operated the waterworks.

Richard Radford (June 5/01), pages 218-219, 222-23

311. As described above, the Walkerton PUC's annual budgets would be sent to Town council for review and approval (e.g. if the budget contained reserve transfers). On a few occasions in previous years, the Town approved PUC borrowing in order to carry out capital projects. It does not appear that the Town ever rejected (or even seriously questioned) any PUC budget presented to it for review and approval.

Richard Field (Nov. 27/00), page 92
Jim Kieffer (Nov. 16/00), page 30
Richard Radford (June 5/01), page 164

312. In effect, the Town had control over the pursestrings of the Walkerton PUC.

James Bolden (Nov. 28/00), page 214

313. In some instances, the Town and the PUC jointly applied for various grants and loans for waterworks projects. With respect to the Provincial Water Protection Fund, the PUC's sizeable reserves made it ineligible to apply for funding assistance for projects such as wellhead protection.

Richard Radford (June 5/01), pages 163-64
Richard Radford (June 6/01), pages 56-58

314. In addition, the Town would co-sign with the Walkerton PUC on applications for certificates of approval required by law.

Richard Radford (June 5/01), pages 163-64

315. In theory, the Town could appropriate any reserves accumulated by the Walkerton PUC, although in practice this does not appear to have occurred.

Richard Radford (June 6/00), pages 235-36

316. The 1998 MOE inspection report by Michelle Zillinger was received and discussed by the Town Council. However, the Town Council did not follow up with the Walkerton PUC to ensure that the MOE's findings and recommendations were satisfactorily addressed by the PUC.

James Bolden (Nov. 28/00), pages 181-87
Richard Radford (June 5/01), pages 171-73, 199-200

317. Prior to May 2000, there appears to have been no consideration or discussion by the Town of establishing a wellhead protection zone around Well 5. If a wellhead protection zone was to be established around Well 5 via property

acquisition, this acquisition would have to have undertaken by the Town, not the Walkerton PUC.

Richard Radford (June 6/01), page 175

318. By May 2000, the Town had significant debt capacity to undertake and finance necessary projects, but it was "reluctant" to borrow money. In addition, although the Town received some $6 million per year in tax revenue, none of this tax revenue was put towards the cost of water services.

Richard Radford (June 6/01), pages 223-24, 240-41
Richard Radford (June 5/01), page 212-13

**c) Alternatives to the PUC**

319. In the context of Ontario's Bill 35 initiative, there was discussion by Town Council in September 1999 about which entity should provide water services to Walkerton residents. The options included retaining the existing PUC, or establishing an affiliate of the new electrical utility.

Mayor David Thomson (Nov. 29/00), pages 123-24

320. The Walkerton PUC prepared and presented a proposal to Town council that recommended the retention of the PUC as the provider of water services to Walkerton residents. This proposal had been reviewed by the PUC Commissioners, and was ultimately accepted by the Town Council.

Janice Hallahan (Nov. 15/00), pages 66-70
Mayor David Thomson (Nov. 29/00), pages 136-37, 161
Ex. 105, Tab 6, PUC Proposal to Town Council
Ex. 102, Tab 10, PUC Meeting Minutes, pages 32-33
Ex. 122(b), Town Meeting Minutes, page 243

321. Despite the Town's acceptance of the PUC proposal, it has been suggested that the long-term fate of the Walkerton PUC had not been decided by the Town by May 2000. For example, the Town was considering the creation of a Water Superintendent within the Town's Work Department, with a view towards the Town taking over water services. In May 2000, it was decided that this possibility would be deferred until matters on the hydro side had been finalized.

Mayor David Thomson (Nov. 29/00), pages 161-68
Ex. 124, Thomson Book of Documents, Tabs 10, 12, 13, 16 and 17

322. In April and May 2000, PUC Manager Stan Koebel believed he was losing control of water services since matters now seemed to be resting in Town

Council's hands. This concern was raised by Stan Koebel with PUC Chair Jim Kieffer.

Stan Koebel (Dec. 19/00), pages 109-11

**d) Town Role Regarding Nutrient Management**

323. In light of concerns about intensive farm operations being established in Bruce County, the Town passed a by-law in 1999 that purported to regulate manure pits and livestock facilities. The threshold trigger under the by-law was set at 150 livestock units, which would not have caught the Beisenthal farm (which, in any event, was already in existence and would have been a legal non-conforming use even if it were an intensive livestock operation). After the Town's solicitor raised jurisdictional concerns about the by-law, the Town subsequently converted it into an interim control by-law.

Mayor David Thomson (Nov. 29/00), pages 174-79
Ex. 122(b), page 70 (Nutrient Management By-Law)

324. The jurisdictional concerns about the original by-law focused on the effect of the *Farming and Food Production Protection Act, 1998*, which stated that no municipal by-law could restrict normal farming practices.

Mayor David Thomson (Nov. 30/00), page 67-68

325. The Town was also aware that Ontario was reviewing the issue of nutrient management.

Mayor David Thomson (Nov. 29/00), page 181

**e) Summary of Key Findings Regarding Town Oversight of the PUC**

326. On the basis of the foregoing evidence, the CWC submits that the Town exercised ineffective oversight over fiscal and other matters relating to the delivery of water services of the PUC. This submission is based upon two facts: first, the head of Town Council was represented on the PUC Commission at all material times, and this *ex officio* member (Mayor David Thomson) participated in the PUC's policy-making and decision-making process. Accordingly, the Town Council (through its representation on the PUC Commission) must be held accountable for any PUC acts or omissions that are found to have caused or contributed to the Walkerton Tragedy.

327. Second, although the Town lacked jurisdiction to intervene in the day-to-day operation of the Walkerton PUC, the Town had clear jurisdiction over key financial aspects of PUC planning and management, particularly PUC borrowing and reserves. The CWC submits that controlling the PUC

pursestrings gave the Town effective charge, management or control over the key planning and policy decisions of the PUC. Moreover, the Town had a clear duty and responsibility to safeguard the health, safety and welfare of Walkerton residents, and therefore had the right (and ample opportunity) to follow-up with the PUC to ensure that drinking water was clean and safe.

328. In any event, as a result of the 1996 amendments (Bill 26) to the *Public Utilities Act*, the Town had ultimate authority over the PUC through its power to dissolve the PUC without electoral assent. This dissolution power was, in fact, belatedly exercised by the Town in January 2001 – well after the events of May 2000, and too late to prevent the Walkerton Tragedy.

### II.D.3. Health Unit

329. In the past, health units had the major responsibility for determination of the safety of communal and municipal drinking water; in fact this was the impetus for creation of the public health system. For example, Dr. Hukowich testified that he had experience gathering water samples for public water systems as a public health employee prior to the creation of the MoE

Hukowich, July 4/01 137:8-25

330. However, over time, and particularly after the creation of MoE, health units began to diminish their involvement and responsibility for public drinking water supplies, considering that the primary responsibility was that of the MoE under the *Ontario Water Resources Act*.

Hukowich, July 4/01 138:4-11

331. Nevertheless, medical officers of health retained responsibility for determination of the potability of the community's water supplies and this responsibility was confirmed in the *Health Protection and Promotion Act*, as well as in the provincial mandatory guidelines as to health units' delivery of services in the community. The mandatory guidelines (1997) in place as of May 2000 expressly required health units to "act immediately in accordance with the ODWO, revised 1994, to protect the health of the public whenever an adverse drinking water test result is received."

Patterson, Dec. 11/00 24:7-21

332. The mandatory guidelines in 1989 spoke of health unit responsibility to "include monitoring the quality of drinking water according to a protocol provided by the Ministry of Health." (Unfortunately there does not seem to have been such a protocol other than for communal water supplies). These guidelines were amended in 1997, and the language was changed to "maintain an ongoing list of drinking water systems; … to receive all reports of adverse

drinking water test results … have a written protocol for dealing with adverse drinking water test results…and act immediately in accordance with the objectives to protect the health of the public whenever an adverse drinking water test is received." This language was interpreted by Dr. Hukowich to mean that the health unit responsibility was decreased. Dr. McQuigge's interpretation was that the wording of the mandatory guidelines was amended to reflect the 1994 Ontario Drinking Water Objectives and the 1996 labs divestiture; in other words because of those changes health units would only be receiving adverse results forwarded from the MoE.

Hukowich, July 4/01 151:2 – 155:24
McQuigge Jan. 9/01 200:10-201:6

**Recommendation: Health units' mandatory program delivery for safe drinking water should include proactive responsibility to monitor and review laboratory test results of drinking water samples in the communities within the health unit. Monitoring should include proactive review of all results, adverse and non-adverse to determine trends and frequency of adverse results, as well as occasional taking of samples as an audit practice, and the resources of the health units should be sufficient to allow for this.**

McQuigge Jan.9/01 204:2-19

333. In a foreshadowing of the Walkerton tragedy, Dr. Hukowich expressed concerns to Dr. Galt, MP for his area, and also at the time, parliamentary assistant to the Minister of the Environment, Norm Sterling, in a letter stating that there was an increasing danger of complacency regarding the safety of Ontario's drinking water and that the public health role in ensuring the safety thereof had been taken for granted and was being jeopardized by recent provincial policy changes. His concerns included changes such as the decision to make health unit funding entirely municipal instead of the previous formula where it was funded 75% by the province, among other concerns. Dr. Hukowich even called for a public inquiry into protection of drinking water in the province before anything happened.

Hukowich July 4/01 139:4 – 145:15; Exh. 407, tab 2

334. A major difficulty in the determination of "unsafe drinking water" under the Ontario Drinking Water Objectives was that those Objectives were unclear as to who had the responsibility to calculate that over ten percent of samples in the month showed the presence of coliform organisms. This was an issue both before and after lab privatization. Once the health unit was no longer receiving all of the results, positive and negative, it had no data to carry out such an evaluation. Before the 1996 lab divestitures, when all of the Walkerton PUC results, both positive and negative, were being sent to the PUC, the MoE and the health unit, any of these agencies could have made this

evaluation. However, the ODWOs did not specify the responsibility for this determination and without the data, the health unit could not carry out this type of oversight of the potability of the Walkerton water supply.

Patterson Dec. 11/00 51:20 – 54:1
D'Cunha June 28/01 73:7-75:4

335. Health unit access to a full database of all results, adverse and non-adverse is important to a health unit in coming to decisions that have to be made by the health unit, (such as investigating an outbreak or issuing a boil water advisory.) Mr. Patterson testified that the reporting of all water sampling results to the health unit, adverse and non-adverse, or access to a data base of all of these results provides an opportunity for a statistical base to its tracking and monitoring. Such data provides context for adverse results. He stated that this would be very beneficial for delivery of the safe water program.

Patterson Dec. 13/00 195:7-11
D'Cunha June 28/01 182:20-183:19

**Recommendation: The roles and responsibilities of each agency to maintain, contribute to and review a data-base of each municipalities drinking water sample results must be specified, and should include over-sight by health units from the public health perspective in particular.**

336. Mr. Patterson wrote to Mr. Page in 1996 to query what assurances there were and what was being put into place to ensure lab testing of municipal supplies, and notification would continue after the Ministry of Health labs withdrew from routine municipal testing. In addition, he expressed these concerns at a meeting of the health unit's water quality committee. He expressed his concerns in terms of the health unit's responsibility to assure potability of public water supplies and to note that if only adverse results were to be forwarded, the health unit would not know if no sampling was even being done.

Patterson Dec. 13/00 83:25-87:20

337. In fact, as of May, 2000, the BGOSHU had received no written or adverse results as to the Walkerton water system whatsoever since the 1996 divestiture of labs by the Ministries of Environment and Health. (There was evidence of some telephone calls from MoE abatement staff to Mr. Schmidt of the health unit in that time frame.) The health unit was therefore unable to discharge its responsibility for oversight of the Walkerton water system. On the other hand, if the health unit had proactively reviewed its records from all water systems in its area (and it had a responsibility to maintain a list of them), it should have noticed that it was receiving no written adverse reports from Walkerton and inquired as to whether it was because there were never any

adverse results or because the notification system had broken down. Mr. Schmidt was aware of some verbal results. The health unit also did receive the 1998 inspection report and this alone should have alerted the health unit to the fact that it was not receiving written copies of adverse results which had clearly been obtained. The evidence disclosed that the GAP laboratory did forward adverse results to the MoE, so the MoE failed to forward these results in writing to the health unit.

Patterson Dec. 13/00 208:8-18

338. Another example of alarms being raised about the potential for gaps in the system was that the association representing public health inspectors wrote to Minister Clement with concerns that no-one was ensuring that owners of water treatment plants are sampling and notifying as required.

Ex. 311-B, Tab 9

339. A further aspect of health unit oversight is that of ensuring special sampling is occurring according to the ODWOs after adverse results are reported. Dr. D'Cunha testified that medical officer of health oversight responsibility would include advising the PUC and contacting the MoE if it came to the attention of the medical officer of health that special sampling pursuant to the ODWOs was not occurring. The reason for this oversight responsibility according to Dr. D'Cunha is that the 1989 mandatory guidelines specify that a minimum requirement of the health unit is providing advice to the community in meeting the current ODWOs.

D'Cunha June 28/01 80:4-81:19

340. Dr. D'Cunha also testified that he would expect health unit staff to read a water works inspection report (e.g. the 1998 report) and if there was reference to adverse test results, an appropriate professional member of staff would flag it and draw it to the attention of his supervisor and/or the medical officer of health; and that it might require discussion with the MoE and potentially the PUC too. Mr. Schmidt testified that he did read the 1998 report, but there is no evidence that he did anything further. Bev Middleton testified that had she known of the information in the '92, '96 and '98 inspection reports, it would have been useful in her investigation. Mr. Patterson testified that Mr. Bye advised the health unit in a meeting between the health unit and the Owen Sound MoE office on May 2nd, 1997 that all major municipal supplies will be inspected by March 31, 1998; that detailed reports would be forwarded to the health unit on each supply, and that public health inspectors are encouraged to read the reports "as there is a lot of information in them." On the other hand, Dr. Hukowich testified that he had received three years of such reports without any guidance or instruction as to what to do with them, and eventually himself created a template for their review and the guidance of his staff.

Accordingly, on the evidence, the expectations of health units' responsibility after receiving these reports was vague and unclear, and not necessarily consistent across the province.

D'Cunha June 28/01 90:8-91:1
Middleton Feb. 26/01 121:2-12
Patterson Dec. 13/01 93:17-94:16
Hukowich July 4/01 160:14 – 164:15

Finding: The 1997 change to the mandatory guidelines, CWC submits, reduced what had previously been a level of redundancy, or "safety net" in that the health unit, with its health expertise, had responsibility to monitor the state of the drinking water supply to determine safety for the community. An example of this approach was seen in the health unit serving Walkerton, where the health unit staff kept a manual data base of all water supply results, both adverse and non-adverse, up until 1996 when they no longer received all of these results. It is submitted that this allowed them to "monitor" as well as to make more informed judgments when adverse results were received.

Finding: Furthermore, CWC submits, this change in the mandatory guidelines for health units' program delivery regarding public water supplies contributed to the already fractured state of drinking water responsibility among oversight agencies in the province. It contributed to the perception by public health officials that drinking water was primarily the responsibility of the Ministry of the Environment and either reinforced or contributed to the very small amount of time and resources devoted in health units to municipal drinking water oversight (1.5% of 1.2 FTE's spent on municipal water affairs in 1999 by the BGOSHU).

Patterson, Dec. 11/00 29:7-10

341. Mr. Patterson also agreed that occasional sampling of municipal supplies by the health unit would be an important safe guard in an ideal world; the main barrier to doing so is resources.

Patterson Dec. 11/00 196:12-197:16

**Recommendation: Health units should be required to occasionally audit (take their own samples) of municipal supplies in their geographic area and should be provided with sufficient resources to add this task to their safe drinking water programs.**

**Recommendation: The important oversight responsibility of health units must be restored and reinforced in terms of their public health expertise as to safe drinking water. "Safety nets" must be restored in terms of receipt of all data and information, and health units must be required to actively review and make judgments on the adequacy of that information and as to implications for public water safety in their communities. Further recommendations in terms of health units' communications with other responsible agencies, and in terms of public**

**health responsibility in education of operators and others involved in the drinking water system are discussed later in this argument.**

389. With respect to illness outbreak investigation, Bev Middleton testified that it is not the health unit's practice to communicate with the public that they are investigating an outbreak or that an outbreak is occurring when the situation is "closed" as opposed to widespread in the community. Because the outbreak did not initially seem to be affecting healthy adults, but only children and the elderly, she did not consider it a "community" outbreak requiring public notification. She advised that she had not considered notifying the public, and it would not be their practice to advise the public about the kind of investigation they were doing in the first few days of the E. colioutbreak investigation.

Middleton, Feb. 26/01 108:9–112:23

**Recommendation: Health units should immediately disclose to the public all outbreak investigations so that the public is aware of symptoms to watch for; specific cautions as to treatment; and can provide information to the health unit in their investigation. Such advice should be considered integral to the health unit's role in prevention of further spread of illness. Even (and perhaps especially) if the outbreak puts certain sub-populations or vulnerable groups at greater risk than healthy adults, community notification should be provided.**

## II.D.4 Ministry of the Environment

### a) Historical Overview

390. A paper prepared by Professor Nicholas d'Ombrain for Part II of this Inquiry provided a historical overview of the provincial government's regulatory oversight over communal drinking water. According to Professor d'Ombrain, the late 19th century saw the creation of a local system of medical officers of health in the larger urban areas. The precursor of the *Health Protection and Promotion Act* was the provincial *Board of Health Act* in 1882, which regulated the local administration of public health.

April 17, 2001, Cavalluzzo, 8:20- 9:1

391. The Act created the Provincial Board of Health, which was responsible for the safety of drinking water. In 1882 the province also enacted the *Municipal Waterworks Act*, which authorized the establishment of municipally owned and funded water utilities. The safety of the drinking water was originally regulated under public health legislation and was regarded as a local matter with province excercising a supervisory role in relation to public health and the operation of the waterworks.

April 17, 2001, Cavalluzzo, 9:2- 9:20

392. In 1927, a new Department of Health was created and the powers of the Provincial Board of Health were transferred to the Division on Sanitary Engineering in the Department of Health. In 1952 an independent agency called the Pollution Control Board was created to investigate and prosecute polluters. The following year, the Objectives for Water Quality, the precursor of the Ontario Water Drinking Objectives, was established; and in 1956, the Pollution Control Board was superseded by the Ontario Water Resources Commission. The Ontario Water Resources Commission had supervision of all ground and surface water in Ontario used as a source of water supply, and control of all aspects of the use of water for public purposes. This included construction and operation of water and sewage works used by municipalities, the licensing of well drillers, approval of the construction, renovation and financing of water and sewage works by municipalities, imposition on owners of water and sewage facilities responsibility for repair and maintenance, and the issuing of orders to municipalities to establish, operate and improve water and sewage works in the public interest. The Commission operated independently, without government inference, except for the submission of the annual report to the Minister.

April 17, 2001, Cavalluzzo, 9:16-11:12;13:12-13:21

393. In 1971 and 1972, the Ontario Water Resources Commission created standards for water quality and maintained supervisory authority for the local waterworks through a system of financing, approvals, licensing and certification. However, the local medical officer of health continued to have a final say concerning the safety of drinking water. The Ministry of Environment, which was created shortly afterwards, assumed the responsibilities for water management, which had previously resided with the Ontario Water Resources Commission.

April 17, 2001, Cavalluzzo, 11:19-12:2

394. According to Professor d'Ombrain, the creation of the *Ontario Water Resources Act* and the MoE marked an important realignment of responsibility for the oversight of the provision of safe drinking water. Firstly, in order to ensure urban growth and economic development the province undertook a massive program of construction in water and sewage treatment facilities and the lion's share of the funding was borne by the province, with emphasis being on public health requirements until 1970.

April 17, 2001, Cavalluzzo, 12:2- 12:11

395. As environmental concerns became increasingly a matter of provincial concern, the agenda began to shift from the Ministry of Health to a wider agenda set by the newly created Ministry of the Environment. The elimination of the Ontario Water Resources Commission signalled a gradual decline in provincial funding for new facilities and put the responsibility for the quality of drinking water under the jurisdiction of the Ministry of Environment. By the 1990s, there was a climate of budgetary restriction which has had an impact on water management in Ontario. According to Mr. d'Ombrain, fewer resources led to two immediate consequences. Firstly, funds that smaller municipalities, in particular, relied on to replace ageing capital equipment and physical plant became scarce. Secondly, the scientific monitoring and inspection services provided by the Ministry of the Environment and the Ministry of Health were shifted to the private sector or reduced and were placed on a cost recovery basis.

April 17, 2001, Cavalluzzo, 12: 12- 13:20

**b) The Role of MoE Inspections**

396. The frequency of inspections of municipal water works also varied over the years. In 1974, the objective was for all non-OWRC facilities to be inspected annually with smaller facilities with less experienced operators to be given priority. There was a dedicated group of inspectors who were provided with basic training on water treatment plants. However, after 1974, the MoE decentralized its operation and created six region and twenty-two district offices across the province. After the decentralization of MoE's operations there was no dedicated group of inspectors to inspect municipal water works. Instead, water treatment inspections were only one of the many types of inspection carried on by district staff.

Panel - Little, Mahoney, Shaw, April 17, 2001, 43:15- 45:22

397. After 1989 there was no prescribed frequency of inspections but rather inspections were conducted if MoE was contacted about specific problems. Consequently the inspection programs evolved into a more reactive as opposed to a proactive program. This meant that the Walkerton PUC, which had been frequently inspected in the early 1970s, was not inspected between 1981 and approximately 1991.

Panel- Little, Mahoney, Shaw, April 17, 2001, 46:12- 50; 48:50- 49:17

398. It was not until the Provincial Auditor expressed concerns in his 1988 report about the MoE's lack of scheduled inspection of municipal water and sewage treatment plants that MoE established its Sewage and Water Inspection Program ("SWIP") to inspect municipal water works.

Panel - Little, Mahoney, Shaw, April 17, 2001, 114:1-115:1

399. Seven years after the creation of SWIP, MoE was aware that nine municipalities were in non-compliance with the sampling requirements and one municipality had explicitly informed MoE that it would not comply with the MoE's minimum sampling requirements.

Panel- Little, Mahoney, Shaw, April 18, 2001 23:15-24:11
Exhibit 283, Letter from Phil Bye to Tim Little dated July 31, 1997

400. However, the MoE did not take steps to shift to mandatory abatement steps by issuing Director's order to bring municipal water treatment plants into compliance with bacteriological sampling requirements and monitoring requirements set by the ODWOs. Instead in early 1998, MoE issued notices, (which unlike a Director's order are non-enforceable) advising them to comply with the minimum sampling requirements. The bulk of these notices were issued to municipalities in the south west region, the same region which was noted in the MoE's 1992 Status report on Air, Water and Soil, as having the highest level of bacterial contamination in the province.

Panel- Little, Mahoney, Shaw, April 18, 2001, 29:16-31:21
Panel- Janse, Mahoney, Little, May 9, 2001, 171:11-178:2.

401. The Town of Walkerton was on the MoE's list of municipalities not complying with the requirements of the ODWO as of July of 1997. However by October 1997, Walkerton was removed from the list once it indicated that it would comply with the minimum sampling requirements.

Panel- Little, Mahoney, Shaw, April 17, 2001, 177:15- 178:25; April 18, 2001, 30:12-30:14

402. MoE inspectors who inspected the Walkerton PUC pointed out deficiencies to the staff but did not follow up to verify compliance. For instance, Mr. Larry Struthers testified that the Walkerton PUC had been advised in the 1996 inspection report that it was not undertaking a sufficient number of samples. However Mr. Struthers did not follow up to ensure that the PUC was doing the required number of samples Mr. Stan Koebel had committed to do. Similarly, Ms. Michelle Zillenger testified that she never had any evidence which would clearly indicate to her that Stan Koebel was in fact addressing the issues raised in her 1998 report outside of his letter in response to her inspection report.

Struthers, October 26, 2000, 266:3-267:22
Zillinger, November 7, 2000, 10:18-11:2

403. By the early nineties, there was evidence of increasing bacteriological contamination in south west Ontario. The MoE's Status Report on Ontario's Air, Water and Waste notes on page 51 that levels of nitrates, fecal coliforms and turbidity had increased or remained unchanged in most areas since the 1970s. Nitrate levels in particular were on the rise, increasing at 45 percent of the sites and decreasing at only four per cent. Most of the increases were registered at sites in the southwest and could be attributed mainly to fertilizers and other agricultural sources.

Exhibit 330-A, Tab 1, 1992 Status Report on Ontario's Air Water and Waste, p.51

**c) MoE's Regulatory Reform Programme**

404. When the current government was first elected in 1995, it announced that its primary mandate would be to undertake regulatory reform. The government announced in its throne speech that it would initiate a red tape review of regulations affecting business with a view to removing barriers to economic growth, improving efficiency in government, improving client services, responding to the emergence of new environmental management approaches and ensuring a balance between environmental protection and economic renewal. The scope of the review covered a total of eighty MoE regulations that were to be reviewed under this process.

Cayen, May 17, 2001 14:20-17:9

405. The regulatory review process began to increasingly consume MoE staff time and resources from 1995 to 1997 until the Policy Development Branch was disbanded. At no time did the Red Tape Commission seek to obtain any input from the Policy Development Branch as to what it considered to be the environmental risks facing Ontario. During 1995 until the Policy Development Branch was disbanded it did not undertake any work on the state of bacterial contamination in surface waters in Ontario.

Cayen, May 17, 2001, 118:23-1119:19;127:25-128:21

406. The Delivery Strategies, which came into effect in June 1998, identified certain program areas as being no longer a focus for the MoE. The delivery strategies indicate that that the MoE had determined that it would move away from regulating non-point source discharges and only focus on point source pollution. Point source pollution would normally be from a single facility, for example a smokestack or an effluent pipe. A non-point source discharge would be for a diffuse source, for example runoff from an agricultural waste. The MoE's Operations staff was advised by the delivery strategies that they would no longer deal with agricultural non-point issues.

Winfield, May 28, 2001, 1163:14-66:12.
Exhibit 287 D, Tab 24, Delivery Strategies Summary Document, March 17, 1998

**d) Concerns Raised About Government's Policies**

407. Environmental organizations in Ontario expressed serious concerns about the policies pursued by the government in relation to environmental laws and regulations. In a report entitled "Our Future, Our Health," these groups expressed concerns that further action was needed to protect Ontario's environment but that the government had instead moved in the opposite direction by weakening rather than strengthening Ontario's environmental protection system - with the result that Ontario citizens were exposed to greater environmental risks than they had previously been. With respect to the areas of surface and groundwater, the report cites the MoE's 1992 Status Report findings that there was surface and groundwater pollution from agricultural sources. The report notes that the government was proposing to expand protection for agricultural activities from the requirements of environmental protection through the *Farm Practices Protection Act*, and also proposing to weaken the monitoring and reporting requirements under MISA regulations.

Winfield, M May 28, 2001, 23:16-27-12
Exhibit 340-A, Tab 12, Our Future, Our Health: A Statement of Concern by Environmental Organizations in Ontario (March 1997)

408. The policies being pursued by the government in relation to communal water was the subject of criticism by the former Environmental Commissioner in her final report. The Commissioner sets out her comments in the report under the heading "Ontarians Had No Say" and notes that the decision not to test drinking water was made without any consultation with either the public or municipalities. The Environmental Commissioner cites the concerns raised by the Provincial Auditor in a 1996 report that because of "resource constraints, drinking water testing by hundreds of small treatment plants is not audited by the Ministry." The Auditor had noted that the decision most likely increases the risk of inadequate drinking water testing in Ontario. The Environmental Commissioner stated that Ontarians expect safe, reliable water to drink and recommended that drinking water be rigorously tested to ensure that contamination is found and fixed right away.

Stevens, May 28, 2001, 50:19-56:24.

**e) Impacts from Budget Cuts**

409. MoE staff in numerous documents also frequently raised concerns about the adverse impacts the budget cuts would have on the environment and human

health. The first memo outlining these impacts was prepared by Ms. Sheila Willis, a former Assistant Deputy Minister for the Operations Division, for Mr. Richard Dicerni, the then Deputy Minister. The memo, dated June 28, 1995, states, "In examining the proposals available within the existing legislative / regulatory framework, it became apparent that only minor reductions could be achieved if the current level of risk of regulatory negligence and associated liability was not to be increased." Attached to the memo was a document, which outlined the core and non-core functions of the Ministry, with communal water being deemed as the latter.

Stevens, May 28, 2001, 169:7-173:9.
Exhibit 330C, Tab 3. Memo on Implementing Change from Sheila Willis, Assistant Deputy Minister, to Richard Dicerni, Deputy Minister, dated June 28, 1995.

410. Ms. Willis sent another memo to Mr. Dicerni a few weeks later dated July 21, 1995 regarding the expenditure reductions. In her memo Ms. Willis states she had made a number of assumptions in preparing the report and one of the assumptions was that the government would be prepared to accept increased risks, that is legal, environmental, and public health risks, in the short term to achieve the desired level of cost reduction. Ms. Willis further states:

> "Constraints as envisioned in the options package will seriously and significantly impair our ability to meet our statutory obligations. This statement is being made in light of the fact that many existing regulatory programs have already been resourced on the basis that inspection and enforcement activities are somewhat discretionary with planning considerations dominated by available financial and human resources. The result is a risk that some programs have already fallen below the threshold of reasonableness established by the courts in recent regulatory negligence decisions."

411. Ms. Willis identified one of the constraints for Operations Division as a "detrimental impact on many of the client service. This includes increased environmental risks resulting from our inability to conduct pro-active inspections, devote time to a through review of approvals and a reduction in available scientific expertise within the Division to support district staff; reduced levels of responsiveness."

Stevens, May 28, 2001, 191:193:18
Exhibit 330-D, Tab 2, Memo from S. Willis to R. Dicerni re; Multi-year Constraints dated July 21, 1995, p.2-3.

412. A month later, Ms Willis sent another memo to Mr. Castel dated August 14, 1995 entitled Constraints in which she states "There are health and

environmental risks associated with changes of this magnitude; and without significant legislative changes, that can only be expedited through an Omnibus Bill, this scale of down sizing exposes the government to unprecedented legal and public challenge. Ultimately, the reduction in proactive inspections, approval functions, pesticides management, and environmental quality monitoring will result in increased risk of long term impact on the environment."

Stevens, May 28, 2001, 194:19: -196:9
Exhibit 330D, Tab 4, Memo from S.Willis to A. Castel et al re: Constraints dated August 14, 1995

413. A document entitled "MoE Expenditure Management Plan" dated August 18, 1995 also notes that the expenditure reduction would impact functions, in particular it notes that there would be a "Reduced ability to detect, diagnose and remedy threats to the environment and human health resulting in decreased public confidence. Reduced credibility as a leading edge environmental organization; reduced leverage on inter-jurisdictional issues. Ministry more reactive than proactive (on environment and energy).

Stevens, May 28, 2001, 199:21-202:21
Exhibit 330D,Tab 5, Ministry of Environment and Energy Expenditure Management Plan, August 18, 1995

414. The MoE also submitted a document to Management Board setting out the summary of expected impacts from the reduction in expenditures. The document, signed by Ms. Stevens, the former Deputy Minister, states under the heading Summary of Impacts: "In general, the impact of these reductions include: elimination of staffing flexibility to fill necessary highly skilled technical positions; and less monitoring, compliance, enforcement, standard setting etc. activities which may increase environmental and health risks and increase the Ministry's exposure to charges of regulatory negligence." The document further states that "These reductions will have an adverse impact on the delivery of environmental protection service levels, which in turn will increase public health and safety risks." The document was signed by the Minister and approved by Management Board.

Stevens, May 28, 2001, 202:23-206:6
Exhibit 330D, Tab 7, Ministry of Environment and Energy, 1995-96 Expenditure Reduction and Strategy dated September 1, 1995, p.4.

415. On September 13, 1995 Mr. Castel sent a memo to all four Assistant Deputy Ministers and copied it to, Ms. Stevens, MoE's Deputy Minister, Mr. Jack Johnson, Director of MoE's Legal Services Branch, Tom Coleman, Director of Communications Branch, and C. King, Ms. Stevens's Executive Assistant, in which he provides more detailed information regarding the impact of the

expenditure reductions. In his memo Mr. Castel provides an extensive analysis of the increased risk to human health and the environment as a result of the expenditure reduction plan by the government. For instance, Mr. Castel notes that the implication of the expenditure reduction would mean a reduction in monitoring which in turn "will result in the decreased ability to assess trends in the environment, and the effectiveness of Ministry activities" and that "decreased monitoring of air quality, drinking water and contaminated sites will lead to increased risk of adverse health impacts." Mr. Castel further noted that reduced compliance activities would lead to an increased risk to human health and the environment as the number of investigating, enforcement, prosecutions, and abatement actions which could be undertaken would be reduced.

Stevens. May 28, 2001, 206:12-212:12
Exhibit 342, Tab 2, Memo from André Castel, Assistant Deputy Minister, Corporate Management Division, to Assistant Deputy Ministers, on the Expenditure Management Plan, dated September 13, 1995

416. The government requested that Ministries submit business plans, outlining the Ministries' shift in core businesses, key activities which would be undertaken in the next three years, and the proposed performance measures. The MoE's Business Plan dated January 22,1996 was submitted to a Joint Policy and Priorities Board and Management Board, and was signed by former Minister Brenda Elliott and Ms. Stevens. The Business Plan noted that some of the impacts from expenditure reductions would be that:

> The Ministry's presence in some communities will be substantially reduced as a result of the reduction in frontline staff and elimination of one regional office, and one district office, four sub-offices, and the closure of three regional laboratories. The Ministry's ability to monitor and assess environmental change and give early warning of long term serious threats, ensure compliance with environmental standards and regulations, and develop policy and programs in response to emerging environment and energy issues will be reduced. .... The risk to human health and the environment may increase as a result of improper or illegal actions which are neither detected, nor controlled through orders and prosecutions as a result of decreased compliance and enforcement activities.

Stevens, May 28, 2001, 218:4-223:7.
Exhibit 330 E, Tab 1, Ministry of Environment and Energy Business Plan (Confidential) dated January 22, 1996, p.2.

417. Neither the Deputy Minister nor Cabinet requested that a risk management plan be prepared to address the negative impacts that were expected to result

to the environment and human health from the substantial expenditure reductions. According to Mr. Norm Sterling and Ms. Brenda Elliott, former Ministers of Environment and Energy, they believed the risks identified by senior management were "manageable". Minister Sterling testified that his staff had repeatedly advised him that the risk would be managed but yet he never asked his staff precisely how the increased risks would be managed. There is also no documentation to corroborate the Minister's evidence at the inquiry that the MoE staff had assured them that the increased risk to the environment and human health could be managed. However, there are at least ten documents prepared by MoE's senior management outlining in detail the increased risk to the environment and human health that would arise from the substantial reduction in expenditures and staffing at MoE.

Stevens, May 29, 2001, 95:25-97:3
Sterling, June 27, 2001, 148:17 - 151:15
Elliott, June 26, 2001,69:6-75:18;147:24-152;11

418. The Premier knew, or had access to business plans and other information submitted to Cabinet which outlined the increased risk to the environment and human health arising from the budget reductions. He did not act in any way to address them. He relied solely on the Environment Ministers to address these matters.

Harris, June 29, 2001, pp. 46-82; pp. 170-171

**Summary of Key Findings regarding MoE's Oversight of the PUC**

The MoE exercised a weak and ineffective regulatory oversight over the Walkerton PUC. For almost a decade commencing in the early 1980s the MoE did not undertake inspections of the Walkerton PUC. In 1990 in response to concerns raised in the Provincial Auditor's 1988 report the MoE established the SWIP program. Seven years after the inception of SWIP, MOE was aware that municipalities were not complying with the bacteriological sampling and monitoring requirements established under the ODWO. Yet, MoE did not shift its approach from a policy of voluntary compliance to mandatory abatement. Nor, did MoE inspector's follow-up promptly on verifying compliance in relation to deficiencies noted during the course of inspections of the Walkerton PUC.

In 1995, the newly elected government began undertaking a program of regulatory reform and began implementing substantial budget cuts at MoE. MoE's senior management repeatedly raised concerns in numerous memos about the increased risk to the environment and human health, which would arise from these substantial cuts. Both Ministers Elliott and Sterling were well aware of MoE' s senior management concerns.

According to the Ministers they believed on the basis of advice from MoE staff that these risk were "manageable."There are however, no documents to corroborate the claims made

by Deputy Minster Stevens, Minster Elliott and Minster Sterling that the risks identified by MoE's senior management could, in fact, be managed.

MoE's senior managment's concerns regarding the increase in environmental and human health risk flowing from the substantial budget cuts was reiterated in the 1996 Business Plan submitted to Cabinet. It does not appear that Cabinet requested any action be taken by MoE to address these risks and neither did Minister Sterling and Minister Elliott. Consequently it would seem that Minister Elliott and Minster Sterling made a decision to proceed with implementing the expenditure reductions at MoE with full knowledge that it would increase risk to the environment and human health in Ontario. Accordingly, Minister Sterling and Minister Elliott who were ultimately responsible for MoE's policy and decision- making role, must be held accountable for any MoE actions or omissions that are found to have caused or contributed to the Walkerton tragedy.

Ultimately, the Premier, as the leader of the government, is responsible for the actions of his government and his ministers and in particular, for the impacts and risks associated with the dramatic resource and funding reductions and other regulatory and policy reforms.

## II.E. LABORATORY TESTING AND NOTIFICATION (ACCREDITATION & PRIVATIZATION)

419. In the course of evidence, a number of issues arose with respect to the closing of the Ministry of the Environment laboratories. More specifically, these issues include:

- Notice Given With Respect to Closing of Laboratories
- Confidentiality Policies of Private Labs
- Interpretation of the Ontario Drinking Water Objectives by the Labs
- Timing and Implications of Delay of Notification

### II.E.1 Notice Given With Respect to Closing of Laboratories

420. During late 1995 and early 1996, the MOE were contemplating the closing of the three regional MoE laboratories as well as the municipal testing portion of Ministry of Health laboratories. These labs undertook routine testing for communal water systems for most municipalities within Ontario, including Walkerton.

421. Evidence was given that only two months' notification was given to municipalities by MoE of lab closings. Similarly, only two months' notification was later given to municipalities served by the Ministry of Health labs.

Schnyder May 7/01 111:4-17; 134:13-135:24

422. This timeframe of two months was simply inadequate to give municipalities time to consider and act upon the implications.

Schabas June 25/01 36:16-37:6

423. The decision to reduce the notice period to municipalities and close the MoE labs in only two months was not a decision of the Laboratory Services Branch of the MOE. Its manager stated the "it must be the Government's decision to move the situation along quickly." Dr. Schnyder protested that this had risk, but he felt obliged to find ways to implement the decision. Furthermore, the decision to give only two months notice was a surprise to the Ministry of Health's Laboratory services branch and to the public health branch. However, the latter did not ask for reasons for the decision. Premier Harris later testified that ministries were obliged to follow the direction of the central agencies.

Schnyder May 7/01 136:1-137:18
Brodsky May 8/01 28:4-24; Demshar/Brodsky May 8 29:13-17
Harris June 29/01 18:22-19:20

424. The lab privatization decision was made confidentially with no public consultation, at the level of the ADM's of environment and health, and at cabinet office.

Schnyder May 7/01 139:13-21
Demshar May 8/01 62:22-63:1
Brodsky May 8/01 79:1-14

425. According to Dr. Schabas, the motive for divesting the public labs of municipal water testing responsibility " was a decision that wasn't being made to improve public health services; it was a decision that was being made fundamentally to save money for the government"

Schabas, June 25, 2001, 38:6-18

Finding

The process and timeframe for the closing of labs was inadequate. The inadequate process and timeframe, lead to confusion among all players as to the new regime. There were insufficient measures to assure a proper transition to private labs. As it will be noted, one of the areas of confusion relates to the interpretation of the ODWO.

### II.E.2 - Notification of Adverse Results - Confidentiality

426. Until July of 1999, GAP Laboratory's practice for notification in the case of adverse results for a drinking water sample was to send a fax to the PUC and to the Ministry of the Environment office with responsibility for the area. After July of 1999, GAP instituted an early notification procedure in case of preliminary or presumptive reactions in the presence/absence test (such reactions could be seen as early as 6 to 8 hours after initiating the test). In that event, GAP faxed the PUC and the MOE with this presumptive notification at that time. If it was later confirmed positive, GAP sent another confirming fax to both agencies. If it was later confirmed negative, GAP notified only the PUC.

Palmateer, Vol. 4, 92:15; 96:22

427. In May, 2000, A&L Labs took over from GAP to undertake Walkerton's microbiological testing. GAP notified the Walkerton PUC that it would no longer be performing those services after May of 2000. The Walkerton PUC was the first client for A&L Labs with respect to microbiological testing.

428. According to the evidence of Robert Deakin, it was corporate policy only to report results, including adverse results, to the client, in this case to Stan Koebel of the Walkerton PUC. According to Section 8H13, "transmission of results," A&L's quality manual states:

> It is the intent of A&L Laboratories to ensure the confidential delivery of final results to the customer.

Deakin, October 18, 2000, p. 86, lines 22 –25
Also see: Schnyder May 7/01 141:3-18

429. There was no public health exception to this policy. Mr. Deakin was of the view that this clause was consistent with, and a necessary part of, the process for accreditation with then ISO 17,025 Guidelines [ISO 25]. According to those Guidelines, "The laboratory shall have policies and procedures to ensure that the protection of its client's confidential information and proprietary rights, …."

Deakin, October 18, 2000, pp. 87 -88.

430. The evidence suggests that the procedures and policies have been audited by the Standards Council of Canada and found to conform with their requirements. However, the plain wording of the guidelines do not exclude a public health exception. In fact, Mr. Deakin did not seriously consider the feasibility of a public health exception. As author of the policy, he was not aware of public health exceptions in other occupations.

Deakin, October 18, 2000, pp. 89 lines 15-24, 348 lines 10-25-349 lines 1-15

431. In cross- examination, the following question was asked with the response.

Q. Did you ask any of your auditors whether, for a public health exception that you might discover in your testing, whether you were either required or allowed to report those results directly to the Ministry of the Environment or the Medical Officer of Health?
A. No.

Deakin, October 18, 2000, p. 89, lines 18-24

432. Clearly, there is confusion concerning the notification procedure and the issue of confidentiality. For example, other labs, CAEL members, understood that there was no legal obligation to report even when they were aware of the ODWOs as provincial policy. For example, Mr. Calow of Lakefield Research testified that they had discussions in their office about the conflict between the ODWOs notification provisions, of which they were aware, and the accreditation provisions under ISO 25 which provided for client confidentiality in the absence of another legal requirement. Their view was that as the ODWOs were not a legal requirement, the ISO accreditation standard prevailed. However, upon receipt of a letter from Mr. Gray of the Barrie District MoE advising them (and other labs serving the Simcoe area health units) of the ODWO requirements and that they should be following them. Lakefield Research interpreted this letter as a "legal requirement" and forthwith changed its reporting practices, on notice to its customers, to comply with the ODWOs.

May 8/01 195:19-197:6
Calow, July 30/01, July 30/01 27:17-29; 12:13-30:6; 32:11-22
Gray July 30/01 92:19-33:13; 94:14-95:12, Exh. 440

433. The Drinking Water Coordination Committee did not pursue a recommendation to require labs to report directly to health units because it was felt that the information was 'probably proprietary' and that it would be inappropriate or not possible to so provide.

Jenkins May 10/01 130:3-131:20

434. Dr. Schabas felt that the reporting requirements for adverse water sample results should be a legal requirement because it was his experience from the clinical reporting system that if there was a legal requirement, the reporting was quite reliable.

Schabas June 25/01 48:3-49:7

Findings:

The Commission should reject the view that this corporate policy was necessary for the purposes of accreditation and compliance with ISO 17,025 [ISO 25] Guidelines. The Commission should make a finding that there are, or should be, public health exceptions for adverse water results.

There was confusion as to the obligations of private labs to report adverse results. This confusion arose, one could speculate, due a variety of factors: the unfamiliarity of the labs with the ODWO; the quick closing of the provincial labs together with a lack of accreditation requirements for private labs; and the lack of a MOE program to manage the transition and train private labs about issues such as adverse result notification.

**Recommendation:**

**All private laboratories should be under a legal duty to immediately report adverse water test results to both the Ministry of the Environment and the local medical health officer. This recommendation is essentially consistent with Regulation 459/00 promulgated in August of 2000.**

### II.E.3 The Use of Presumptive Results

435. Until July 1999, GAP laboratory's practice for notification in case of adverse results for a drinking water sample was to send a fax to the PUC and to the Ministry of the Environment office with responsibility for the area. After July, 1999, GAP instituted an early notification procedure in case of "preliminary" or "presumptive" reactions in the presence/absence test (such reactions could be seen as early as 6 to 8 hours after initiating the test). In that event, GAP faxed the PUC and the MoE with this presumptive notification at that time. If it was later confirmed positive, GAP sent another confirming fax to both agencies. If it was later confirmed negative, GAP notified only the PUC.

Palmateer Vol. 4, 92: 15 - 96: 22

436. Development of early notification procedures is highly desirable since drinking water sample results always follow the time when the water being sampled has already been distributed to consumers. However, limited discussion of early notification was ad hoc (e.g. between Sarnia MoE and GAP), rather than consistent across the province.

Palmateer Vol. 4, 96: 13 - 98: 12

437. Although presumptive adverse results can be a false positive, this is rare, and so the safer and more prudent course of action is to take steps to correct the problem as soon as the presumptive reports are seen.

Palmateer Vol. 4 98: 13 99: - 17

438. Even with the introduction of reporting "presumptive" positive E. coli results by the GAP lab, the MoE abatement staff did not take action with respect to with these results until they received a "confirmed" result from the sample. The day or more in time saved in reporting the result to the MoE thus was not utilized in any precautionary manner from the point of view of public health. In other words, the community continued to be exposed to the water while the abatement officer awaited the confirmed result.

For examples, see: Earl, October 31, 2000, p. 33, lines 6-10

Finding

Presumptive results can serve as a precautionary mechanism for waterworks operators and health and environmental officials.

**Recommendations:**

**Consideration should be given for the development of a laboratory best practice to adopt the presumptive results approach. Consideration could also be given as to whether this mechanism could be incorporated into the current regulatory framework.**

**Notification procedures must be mandatory and consistent across Ontario. Early notification procedures should be pursued and both operators and oversight agencies must be trained to respond to the early notification. Labs must be required to give adverse results to the operator, the MoE office and the health unit office.**

**Furthermore, laboratories should be required to report presumptive positive results from presence/absence tests to the operator, MOE and health unit as soon as such results are observed. Although the MOE environmental officers did not act upon presumptive reports, there remains a tangible benefit to the procedure. The evidence points to the fact that false positives are rare.**

### II.E.4 Knowledge and Interpretation of the Ontario Drinking Water Objectives - Laboratories

439. One of the issues was the extent to which A&L Laboratories had knowledge of, and experience with, the Ontario Drinking Water Objectives (ODWOs). Also at issue was how private laboratories interpreted the ODWOs.

440. A&L Laboratories London office did not have real familiarity with the ODWOs. In fact, the only copy of ODWOs in that office was the one in Mr. Deakin's office.

Deakin, October 18, 2000 p. 303 also see: p. 311

441. In terms of parameters, Mr. Deakin relied upon Guidelines for Canadian Drinking Water for Canadian levels of E. coli and coliform. From this document, he was informed that the acceptable levels for total coliform and E. coli was zero.

Deakin, October 18, 2000, p. 73 and p. 185

442. However, it appears that the ODWOs were not relied upon. Mr. Deakin also noted that:

> Q. And prior to May 2000, did you refer to the ODWO with respect to microbiological parameters?
>
> A. No.

Deakin, October 18, 2000, p. 75, lines 16-20

443. The ODWO with respect to notification states:

> If the water contains any indicators of unsafe water quality for any of the reasons outlined above, the laboratory will immediately notify the MOEE district officer who will immediately notify the Medical Officer of Health and operating authority to initiate collection of special samples and/or take corrective action.

444. Two issues arose: familiarity with the notification provisions, and interpretation of those provisions. In evidence, Mr. Deakin responded he was unaware that the ODWO required testing laboratories to immediately notify the MOE if a laboratory's testing disclosed unsafe drinking water.

Deakin, October 18, 2000, p. 187

445. Second, it is also apparent that Mr. Deakin had his own interpretation of these provisions. He explains:

> Q. And I'm asking you again, had you been aware of it, would your laboratory not have notified the MOEE, having found unsafe drinking water quality in the samples?

A. Sir, I'm telling you today that our laboratory reported the result to the people that were in charge of the water as dictated by our policies and our procedure. To go outside of those policies and procedures we would have to change the entire way we operate. We were a private business, we have a client, we reported it to our client who was in charge of the water.

This section that you are talking about, looking at it, is coming under our corrective action section. We were never informed that there was corrective actions, we were never informed of a history here. We had a client that we reported the results to.

Deakin, October 18, 2000, p. 195: 3-21

446. Mr. Deakin's basic understanding is that the "book was designed and written and implemented in 1994 for provincial laboratories." It was his view that notification requirement was essentially an internal requirement of the MOE laboratory. More specifically, it was his understanding that the system changed in 1995 and the labs reported the result to the people that were in charge of the water, "the experts of the water who are the municipality and the manager of this PUC. We did not report to the Ministry of Environment. That was not the failsafe. We reported to the people that were in charge."

Deakin, October 18, 2000, p. 188; p. 272, 20 to 25; also see: p. 346

447. The Lab Services Branch of MoE, however, did nothing to ensure that private labs undertaking microbiological testing of drinking water would be aware of the microbiological portion of the ODWOs.

Schnyder May 7/01 129:10-15

448. Moreover, the Ministry of Health and the Ministry of Environment, at various levels, knew that reporting of adverse results was an issue and that there were problems with adverse results not being reported.

Chuck LeBer May 8/01 284:24-285:9; 312:2-25; 313:2-16
Brodsky May 8/01 61:2-15

449. Even before the 1996 divestment of routine sampling by MoE and MoH labs, there were discrepancies in notification. The ODWOs were not always being followed by labs. Approximately 1/3 to ½ of health units responding to a survey by C. LeBer in 1995 were not receiving adverse results from anyone. These survey results were disseminated to health units and to Mr. Brodsky of the Public Health Branch.

LeBer May 8/01 284:21-287:23; May 9/01 40:10-22

Findings:

There should be a finding that the above-described interpretation of the ODWO by A & L Labs is unreasonable. There is no suggestion in the ODWO that the notification protocols change according to whether the laboratory is public or private.

A further finding, however, should also be made that the Ministry of the Environment did not discharge its responsibility to provide the necessary guidance, support and transition programs for the private labs. This transition program could have included more educational and training material to assist the private labs.

### II.E.5 Knowledge and Interpretation of the Ontario Drinking Water Objectives – Non-Lab Actors

450. There was a confusion of roles and responsibilities within the MoE staff itself as to lab reporting requirements. Furthermore, MoE staff did not always forward adverse results to the health unit even when they were reported to them, including in Walkerton.

451. Stan Koebel did not notify the health unit or the MoE of adverse results on May 17th, 2000. It had never previously been his practice to notify the MoE nor the health unit. With the Palmerston lab, the lab did the notification, and with Palmateer's lab, GAP, they continued at least notifying the MoE of adverse results. Historically, when a concern arose, Koebel was phoned by MoE abatement officers or health unit staff upon their receipt of such results; there was not a history of Koebel phoning them.

> S. Koebel Dec. 18 11:21-12:11; 131:21-132:6; Dec. 19 42:3-23; 102:23-103:25; 124:20-125:4; 127:22-128:3
> Palmateer Oct. 19/00 92:15-21; 93:10-21

452. The confusion about notification requirements in case of adverse water sample results was demonstrated by a description prepared by Stan Koebel, prior to May, 2000. He stated that the PUC manager heard about unusual findings from staff of the Ministry of Environment. His description did not mention reports being made to the medical officer of health. Even though he described the lab results as going to the PUC, he did not identify responsibility to deal with those adverse results unless he was contacted by Ministry of Environment staff.

> Hallahan Vol. 19, 70:20 71:8 15/11/00

Finding

Stan Koebel knew or ought to have known his responsibilities concerning the notification of adverse drinking water results. However, the fact that there was confusion and inconsistency in adverse results notification is demonstrated by the many occasions in the evidence when this issue was drawn to the attention of various levels of officials and Ministers in the Ontario government after labs' divestiture in 1996. This will be further explored in another section of this argument.

### II.E.6 Decision Not to Revise the Ontario Water Resources Act or the Ontario Drinking Water Objectives

453. With the decision to privatize routine lab testing, Mr. LeBer had continued concerns about whether private labs would report the results, but he did not then express these concerns. Mr. Jenkins also had concerns and did express those concerns to Dr. Smith, Dr. LeBer and to the committee chaired by Mr. Brodsky.

LeBer May 8/01 294:12-296:5; Jenkins May 10/01 173:7-174:10

454. Thereafter, Dr. LeBer and Dr. Smith sent a letter to all medical officers of health (on December 4, 1996) regarding notification after privatization; including the issue of lack of notification by MoE to health units. Dr. LeBer also brought this issue to the attention of Mr. Brodsky, with a proposed solution from a manager of inspections for a health unit; but Mr. Brodsky preferred not to "circumvent" the provisions of the ODWOs.

LeBer May 8/01 296:18-300:9; 309:3-310:19

455. The notification concerns continued and in July 1997, Dr. LeBer drafted a memo signed by Dr. Wallace, on behalf of Dr. Schabas, medical officer of health, directed to the Assistant Deputy Minister of Health, attaching a briefing note and draft letter for the Minister of Health to sign.

456. A letter dated August 20, 1997 was sent by the then Minister of Health, Jim Wilson to Minister Sterling, (who served as Minister of Environment from August 16, 1996 to June 17, 1999) in which he stated: "This letter is written to request an amendment to the *Ontario Water Resources Ac*t or assurance from your Ministry that adverse drinking water test results from drinking water test results from drinking water system under the jurisdiction of the *Ontario Water Resources Act* are immediately brought the attention of the local Medical officer of health." Minister Wilson also notes in his letter that it is important that policies or legislative procedures are in place to ensure effective and timely reporting of adverse results.

LeBer May 8/01 311:1-316:11
Sterling, June 27, 2001,52:1- 52:20

Exhibit 310D, Tab 7, Letter from Minister Wilson to Minister Sterling dated August 20, 1997.

457. Despite the unusual circumstance of one minister writing to another to request a legislative change, the Minister of the Environment responded that the legislation would not be amended and that the matter should be pursued through the Drinking Water Coordination Committee. However, it remained Dr. LeBer's preference that the matter be dealt with by amendment to the *Ontario Water Resources Act*. The reason for this preference was that the legislative or regulatory approach to notification would be mandatory and enforceable.

LeBer May 8/01 317:4-12; 325:3-11; May 9/01 9:13-10:10
Exhibit 310D, Tab 7, Letter from Minister Sterling to Minster Wilson dated November 10, 1997.

458. Minister Sterling did not follow up to ascertain what if any action the committee was taking in relation to this letter.

Sterling, June 27, 2001, 58:3-60:1

459. One of the reasons that the Ministry of the Environment felt that the legislation would not be amended was because there had already been recent amendments to the *Ontario Water Resources Act*.

Carr May 10/01 148:9-22

460. The Drinking Water Coordination Committee had a mandate to guide and co-ordinate the implementation of the MoE's Drinking Water program. It had been reviewing the ODWO and prepared a draft dated June 1998 (one of many drafts) recommending that the ODWO be changed so that the water testing laboratory immediately notifies the owner of the works and the owner of the waterworks, then notifies the Medical Officer of Health. The proposed draft did not require the MoE to be notified although it was recognized that it was important for the MOE to also be kept apprised of adverse results the water treatment system

Panel Evidence of Janse, Little, Mahoney, May 9, 2001,101:1- 105: 13

461. The proposed revisions of the ODWO drafted by the Drinking Water Committee were supposed to be submitted to the MoE's District Manger's committee, which consisted of four of five district manager representing the individual regions, for review and comment.

Panel Evidence of Janse, Little, Mahoney, May 9, 2001, 107:20-108:23

462. However, it was subsequently, decided that the proposed revisions to the ODWOs should not be submitted to the District Manager's Committee because the MoE was in the midst of ensuring that municipal water treatment plants were complying with the minimum sampling program. The MoE had issued notices to municipalities in early 1998 indicating that it would proceed with a Director's order. The Drinking Water Co-ordination Committee was concerned that if the ODWO was revised at that that point, particularly if it was revised to reduce the scale of sampling it would send an inconsistent message and would undermine MoE's ability to ensure compliance with the ODWOs.

Panel Evidence of Janse, Little, Mahoney, May 9, 2001,108:16- 118:1

463. The Drinking Water Coordination Committee did not consider proceeding with the proposed revisions relating to notification and leaving for another date the proposed revisions to monitoring and sampling because it had wanted to deal with the proposed revisions as a package as opposed to piece-meal amendments.

Panel Evidence of Janse, Little, Mahoney, May 9, 2001,108:16- 118:1

464. The MoE had been advised by health units that that the private labs in Simcoe County with the exception of one were not notifying the MoE and were not complying with the ODWO objectives. The notes from an Owen Sound Areas office abatement meeting stated only some labs were not notifying the MoE without explicit instructions from their client. It does not appear, however, that the members of the Drinking Water Coordination Committee members were aware of the problem of private labs failing to notify the MoE in the event of adverse test results.

Panel Evidence of Janse, Little, Mahoney, May 9, 2001 119:19- 124:20

465. The government established a Red Tape Commission in November of 1995 by order in Council. The Commission established a Red Tape Reduction Impact Test, first know as the "less Paper More Job Test and subsequently known as the Regulatory Impact on Competitiveness Test ("RICT"). The test required MoE staff to do an analysis in accordance with a framework established by the Red Tape Commission. The test had to be utilised in the event any ministry wanted to pass a new regulation and required staff time and resources to collect the data required by the test. The implementation of the RICT test thus had the effect of increasing workload whilst the MoE was also undergoing substatinal reductions to both staff and budget. The use of the RICT type of test in other jurisdiction has also resulted in time consuming and costly process, the net effect being that it is almost impossible to adopt new regulations.

Cayen May 17, 20:19-20:24;28:10-28:24.116:118:9
Winfield, May 28, 2001, 36:1-37:22

466. The Red Tape Commission had undertaken a survey of industry to identify some of the problems they face with the regulatory process s and noted that "reporting requirements are complicated and create unnecessary paperwork. The MoE consulted with the Red Tape Commission on developing as framework for undertaking regulatory reform and one of the identified as criteria for assessing red tape was reporting requirements.

467. Mr. Daniel Cayen, a former manager of the MoE's Policy Development Branch acknowledged that reporting requirements are, in fact a cornerstone of many environmental regulations and essential tool upon which MoE's relies to obtain information from the regulated community. The reporting requirements in environmental legislation provide the necessary means by which the MoE fulfils its regulatory mandate.

Cayen May 17, 2001, 122:14:-125:2; 136:12-127:6

468. On January 16, 1997, Mr. John Tooley, the MoE Areas Supervisor in Belleville, sent a memo to Ms. Stella Couban, a lawyer with the MoE's Legal Services Branch expressly raising concerns about the lack of guarantee that private labs will notify the MoE district office in the event of adverse water test results. Mr.Tooley was attending a liaison committee meeting with the Hastings and Prince Edward County Health Unit and on the agenda was the notification of adverse bacteriological results as outlined in the ODWOs. Mr. Tooley sought a legal opinion on how to deal with this issue at the upcoming meeting.

Couban, July 4,2001, 338:20-340:21

469. Ms. Couban consulted with Mr. Jim Jackson, a senior solicitor with the MoE's head office before responding to Mr. Tooley's request for an legal opinion. Ms. Couban testified that she wanted to ensure that the advice she would be providing Mr. Tooley would be consistent with the advice other members of the Legal Services Branch would be providing on a similar issue.

470. In her reply by e-mail to Ms. Tooley on January 28, 1997, Ms. Couban set out three options. The last option states " In terms of this option, I am not sure whether the concept of a new regulation imposing a new requirement is even a starter with the current regime and its interest in lessening or reducing the amount of regulatory control." In providing her opinion, Ms. Couban considered a number of documents including the "Terms of Reference of the Red Tape Review Commission" dated January 29, 1996; "Reforming Environment Regulation in Ontario, Responsive Environmental Protection, Consultation Paper;" and the final Report of the Red Tape Review

Commission entitled "Cutting Red Tape Barriers to Jobs and a Better Government."

471. Ms. Couban was aware that the government wanted to reduce the regulatory burden on the regulated community and would only pass a new regulation if could be evaluated against ”the less paper more jobs test" which had been established by the Red Tape Commission.

Couban, July 4, 2001, 314:21-335:22.

472. In Ms. Couban’s view, in January of 1997, it was not practical to propose the passage of a new regulation imposing a reporting requirement on the private sector given that the resources of the government were devoted to reviewing the regulatory framework with a view to reducing, eliminating or amending regulations to reduce the regulatory burden on the regulated community. It would have been difficult to convince the MoE that a new regulation imposing a reporting requirement on the private sector, which may also have implications on the workload of the front line staff, was necessary.

Couban July 4, 2001, 335:23-337:12

473. The kind of amendments to the ODWO proposed by the Minister of Health in 1997 were eventually clarified, at least in part, through an August, 2001 regulation, following the Walkerton tragedy.

Findings

The Minister of the Environment should have amended the *Ontario Water Resources Act* to provide for clear requirements for notification of adverse results. The Health Minister raised a very serious concern and it deserved the utmost attention.

It appears that the Red Tape Commission did act as a “chill” for new regulatory initiatives, even those directly aimed at the protection of public health. While no action followed the 1997 Health Minister’s letter, a regulation addressing this issue was enacted within three months of the Walkerton tragedy.

There is further discussion of the implications of the Red Tape Commission in the section entitled “MOE Oversight.”

The Ministers of the Environment must accept responsibility for the with respect to the impacts arising from the privatization of the provincial water testing labs and the delay in clarifying the notification provisions of the Ontario Drinking Water Objectives.

## II.E.7 Certification, Accreditation and Licencing

474. Generally speaking, certification (a term which is no longer used) meant that specific parameters that the laboratory wants to be certified for are selected and then performance tests are undertaken. These tests involve the Canadian Association of Environmental Laboratories (CAEL) forwarding samples to several laboratories and the test results of each returned to CAEL for evaluation. These certification tests or the performance evaluation testing arrived about every six months.

Deakin, October 18, 2000, p. 18, lines 6-16

475. Accreditation occurs after a site evaluation. A reviewer appointed by CAEL or the Standard Council of Canada will visit the lab and they will audit the systems, review the methods and review performance evaluation tests.

Deakin, October, 18, 2000, p. 18, lines 3-20

476. In order to be accredited, the usual process is for the laboratory to participate in performance testing. If successful, the laboratory can ask that those parameters be added to the scope of accreditation during the periodic audit site visit. The site visits take place every two years. Apart from undertaking performance evaluation tests, the auditors could look at methods and the laboratory in general and grant accreditation, however that would have to be done by way of site assessment.

Deakin, October 18, 2000, p. 21, lines 13-21; p. 30, lines 9-14

477. It is clear that A&L labs performed presence/absence tests for total coliform and E. coli in water and membrane filtration for total coliform and E. coli without accreditation or certification. Not only did A&L have no accreditation or certification to test for bacteria in communal drinking water system, but Mr. Deakin admitted that the laboratory had no experience in testing for microbiological parameters.

Deakin, October 18, 2000, p. 28, lines 21 to 23 and pp. 29; pp. 149-150

478. Mr. Deakin noted that the laboratory wanted to undergo a performance test for the presence/absence proficiency test, but it was not available by CAEAL.

Deakin, October 18, 2000, p. 29, lines 1-18

479. While there was no proficiency test for the presence/absence test, there is a proficiency test for membrane filtration for total coliforms. There is no proficiency test for membrane filtration testing for E. coli.

Deakin, October 18, 2000, p. 32

480. Mr. Deakin did not seek accreditation or certification for membrane filtration for either total coliform or E. coli.

Deakin, October 18, 2000, p. 32, lines 15-25; p. 327, lines 3 to 7

481. The family of A&L Labs conducts round robins for soil testing. But it does not include microbiological parameters.

Deakin, October 18, 2000, p. 42, lines 1-3; p. 330, lines 17 to 19

482. After the closure of the public labs, there was no specific regime for formal accreditation for private labs that would be conducting municipal drinking water tests; not even for the microbiological parameters. This was a surprise at the time of the Inquiry to the former chief medical officer of health, Dr. Schabas, who during his tenure did not realize that these private labs were not accredited. He had assumed they would be so required because of his knowledge of the clinical labs legislative model and because of his view that accreditation would be a necessary part of a privatized system. His opinion was that although the public lab system had inherent merits, a privatized laboratory testing system could be made to work, and the province had an excellent model in the medical laboratory system.

Schabas June 25/01 29:25-31:7; 89:7-90:1

483. In contrast to the environmental labs, clinical labs for human microbiological samples operate are under a licensing program pursuant to a law and a regulation and are therefore enforceable. Its provisions included qualifications of all staff, ongoing proficiency testing and an inspection service.

Demshar May 7/01 322:16-323:10

484. Among the reasons for favouring the medical laboratory system, Dr. Schabas cited the strict accreditation standards and the active program of maintenance of competence of these laboratories by the Ministry of Health, as well as the importance of the accuracy of results.

Schabas June 25/01 30:23-31:7

Findings

Formal and comprehensive regimes for accreditation and certification were not required for private labs that undertake testing for microbiological parameters.

A&L labs in particular did not have a full suite of accreditations and certifications for the microbiological testing it did for municipalities.

**Recommendations**

**To ensure that there is a comprehensive regime for laboratories that test drinking water, two options present themselves. Laboratories could be required to attain the accreditations and certifications that are now available or those should be developed under the existing regime. Another option is to adopt a licensing regime where labs, whether public or private, must be licenced and as such, must meet set criteria to both attain and maintain the licence. Some agency would be vested with the authority to administer this program. This basic model is derived from the medical laboratory system.**

**It is submitted that a comprehensive licensing regime, parallel to that of the medical laboratory system is both needed and preferable. The rules of the field would be clearer and more consistent.**

**While no specific licensing regime is being recommended, the model of the clinical labs legislation is working well and should be the starting place for consideration of the needs of environmental laboratories conducting drinking water microbiological testing. Consultation among the stakeholders would be the first step once a decision is made to pursue this option.**

## II.F. OUTBREAK DETECTION

485. One of the ways in which some illness in a community can be prevented during an outbreak is early detection and response to the evidence that an outbreak is occurring. The more effective and immediate the detection, (primarily by the health unit, but in cooperation with other agencies such as the water works operator), the better the opportunities for prevention and containment of the outbreak. Detection of an outbreak is only one means by which officials would realize that a response is needed to protect public health from drinking water risks. As discussed elsewhere in this argument, other means include detection of indicator organisms in the drinking water through the sampling program, or obvious system issues such as loss of disinfection, pipe breaks and other events. However, such events can occur without detection, and sampling can miss the presence of pathogens that cause human illness. Therefore outbreak detection and response remains an important safe-guard.

486. In this section of the argument, CWC makes submissions as to findings of fact as to the outbreak detection process that occurred during the Walkerton outbreak, and makes recommendations as to improvement of same. CWC does note that the health unit issued a boil water advisory on Sunday, May 21st, 2000, and the first possible notice to the health unit of illness in the community was Friday, May 19th, 2000.

487. CWC submits that the earliest opportunity for mitigating and preventive action was in the hands of the Walkerton PUC, once it received notice of the results on the morning of Wednesday, May 17th, 2000. (The fact that the MoE should have received independent notification from the lab and alerted the health unit would have also provided such an opportunity for reaction by the health unit; the labs notification issue is dealt with in Part II.E. of the argument and is not repeated here.)

488. Although many people would have already been exposed to the pathogens in the system by May 17th, 2000 (because the results reflect samples taken earlier), the evidence discussed below shows that each earlier date of intervention, e.g. by a boil water advisory or by shutting down the system, has the potential to have prevented hundreds of cases of illness.

489. CWC also includes submissions regarding the "index of suspicion" of water as a source of an E. coli outbreak and recommendations for future improvement of the outbreak detection system because, as already noted, each day available for action can save hundreds of illnesses in a town the size of Walkerton; or many thousands or hundreds of thousands in much larger communities, and therefore prevent much human suffering.

McQuigge Jan. 9/01 219:14-19

### II.F.1 Communication Failure (Koebel to Health Unit)

490. Stan Koebel received adverse lab results from Robert Deakin of A&L Laboratories (between 8:30 a.m. and 9:30 a.m.) on the morning of Wednesday, May 17th, 2000, both verbally and in the afternoon by fax. These results showed high E. coli in the Walkerton distribution system water. The faxed results sat on his desk, un-reviewed, until Saturday, May 20th, 2000. However, in his verbal advice, Deakin advised S. Koebel that every result from both the water mains and from the town sampling, was positive for both E. coli and coliform and that the counts were high.

Deakin Oct. 18/00 132:7-25; 123:4-124:20
Stan Koebel Dec. 18/00 10:22-11:20; Dec. 20 20:19-23:6

491. There was no alert from Stan Koebel to the health unit about these results, which on their own, even apart from any outbreak, may have (and we now know, should have) prompted a boil water advisory. This could conceivably have been ordered on May 17th, 2000, the day that S. Koebel received these results, if he had promptly notified the health unit.

Stan Koebel Dec. 18 10:22-11:20; Dec. 20 20:19-23:6

492. During subsequent contacts on May 19th, 2000 between health unit staff, specifically, between Stan Koebel and James Schmidt at 3:30 p.m., and between Stan Koebel and Dave Patterson at 4:00 p.m., Stan Koebel did not apprise the health unit staff of these adverse water results. Only on May 23rd, after Dave Patterson received the results of the health unit's own sampling and contacted Stan Koebel to advise him of those results, did Stan Koebel advise Dave that Stan had received results the prior Thursday, and that he had had a chlorinator not working for some time.

Patterson Dec. 11/00 64:7-65:15
McQuigge Jan. 8 196:20-25; 209:4-17
Stan Koebel Dec. 20 48:20-49:4; Dec. 20 52:16-55:14

## II.F.2 – "Chance" Discovery by Owen Sound Pediatrician

493. Dr. Kristen Hallett, an Owen Sound pediatrician, by her training and by the "chance" occurrence of having two patients from the Walkerton area referred to her with similar symptoms, noticed these connections and contacted the health unit on Friday, May 19th, 2000, before any increase had been noticed in illnesses by virtue of the provincial surveillance system. The provincial surveillance system played no part in noticing the increased level of illness nor identifying the fact that an outbreak was occurring.

Kristen Hallett Jan. 17/01 28:3-11
McQuigge Jan. 8 147:22-148:19
Middleton Feb. 26 36:13-14; 37:19-38:6

**Recommendation: There must be systematic improvements to public health surveillance and outbreak detection; there will not always be the opportunity for one physician to notice such connections and outbreak detection cannot be left to such contingencies. There are likely many outbreaks and lower levels of illness from pathogens in water that are missed by the public health system. Without Dr. Hallett's intervention, especially with the long weekend intervening, it may have been several days before the fact of an outbreak came to the attention of the health unit, with an even greater delay in investigation the outbreak causes and in ordering a boil water advisory. In a large community, it is even more difficult to detect a waterborne disease outbreak.**

Payment Feb. 28/01 27:2-20; 12:14; 32:9, 75:3

## II.F.3 – Health Unit Delay to Review Records

494. Health Unit staff did not review their own records of the Walkerton water system until May 27th, 2000 (at which time Mr. Patterson skimmed the file only), and June, 2000 as to detailed review of the contents. Review of the health unit's own records immediately, would have revealed a prior history of

E. coli in the Walkerton water prior to 1996; the 1995 discussion of a possible boil water advisory and the 1998 MoE investigation report, among other things. On the other hand, review of the file would not have revealed any adverse results in writing subsequent to the 1996 lab closures, other than the 1998 report, and the only person in possession of that information, in his diaries, was Mr. Schmidt, the health unit inspector for Walkerton. Immediate review of water records may have provoked greater immediate focus on water as a potential source by the health unit and / or precipitated a Boil Water Advisory as early as the date on which Ms. Middleton had "an uneasy feeling about the water", i.e. Friday, May 19th, 2000. However, this possibility is compromised by the lack of systematic provision of results to the health unit after 1996.

Patterson Dec. 13/01 27:13-28:13; 31:9-14
Middleton Feb. 26/01 121:2-12; 105:17-106:5

**Recommendation: In addition to the recommendations about access to a database, proactive review of water system records and clarification of oversight responsibility for routine sampling results made elsewhere in this argument, CWC adds the submission that in an outbreak investigation for any illness for which there is a possibility of transmission by water (treated or untreated), the health unit automatically review the records of the relevant water system/s as one of the initial tasks to be conducted in the very earliest stages of an investigation. This information will assist in providing additional leads and possible focus of an investigation, and may assist in preventing water from being ruled out as a possibility or downplayed too early in the investigation.**

### II.F.4 – Health Unit Delay to Sample

495. The health unit did not take samples of the Walkerton water for microbiological testing itself until Monday, May 22nd (after it issued the Boil Water Advisory on the Sunday) and received those results on Tuesday, May 23rd, 2000. Immediate sampling of the water by health unit staff on Friday, after receipt of the call from Dr. Hallett, and reporting of presumptive positive results by lab could have occurred by Saturday, May 20th, 2000, precipitating a Boil Water Advisory by that date (if a BWA had not been precipitated by the lab and/or PUC reporting the adverse results on May 17th, 2000 to the MoE or the health unit.) The epidemiological evidence of Dr. Ellis reviews the number of possible illnesses prevented with each day of an earlier Boil Water Advisory. For example, a Boil Water Advisory issued by May 17th upon receipt of notice from the lab by the PUC could have potentially prevented 201 to 636 cases of illness; more likely between 500 and 570 cases. A Boil Water Advisory issued by Saturday, May 20th, if the health unit had taken samples on the 19th of May could potentially have prevented 339-414 cases of illness.

Ellis Jan. 11/01 106:13-107:16
Exh. 245, Ellis undertaking response, p. 1
Middleton Feb. 26/01 122;16-25
Patterson Dec. 11/00 117:25-118:21; 131:11-21

**Recommendation: Sampling should be done by the health unit itself, at many points in a community, immediately upon commencement of any outbreak investigation, even where food is a primary suspected source.**

496. However, it must be noted that it is still very possible that even sampling immediately upon outbreak investigation may not detect pathogens in the water. Reasons include the incubation period for the pathogen, or because the pathogens may have moved through the system by the time symptoms appear and people visit their physicians. Other reasons include for example, that if the problem was due to lack of chlorination, the system may be working again and disinfecting the pathogens, or because the volume of pathogens entering the system may be reduced over time and the chance of detecting them is therefore decreased.

Payment Feb. 28/01 27:2020; Mar 1/01 12:18-13:14
Palmateer Feb. 28/01 242:17-25
Patterson Dec. 13/00 220:8-22
Ellis Jan. 11/01 27:12-31:4 (re under-reporting; timing of specimens)

497. Accordingly, recommendations for increased health surveillance, faster turn around times for water sampling, and other monitoring improvements such as for turbidity and other indicators are imperative in order to try to prevent exposure of the community to the pathogens, rather than merely detecting the cause after exposure can no longer be prevented.

Payment Feb. 28/01 12:13-17; 28:3-11

## II.F.5. – Health Unit Downplaying Water as a Source

498. There is some controversy in the evidence as between health unit staff as to whether water was actively pursued and investigated as a source from the very outset of the investigation. CWC submits that it had not been ruled out, but that it had been downplayed, from very early in the investigation and that the health unit did not actively and assertively investigate the water as a source. However, there are several reasons why this should not have occurred, and water should not have been downplayed. These reasons included the large numbers of people affected in the community, the different age ranges affected in the initial stages, (particularly the young and the elderly), and the recurring questions from the community and institutions about the safety of the water. Other factors included the statements reported to Dr. McQuigge by

the spills action centre MoE phone staff, and the nursing home initiating its own boil water protocol.

Patterson Dec. 11/00 67:17-68:11
McQuigge Jan. 8/01 209:2-9
Middleton Feb. 26/01 36:15-39:25; 89:890:2

499. Even though she had an "uneasy feeling" about the water by the evening of Friday, May19th, 2000, (due to what people were asking her and due to already ruling out several obvious food sources), Ms. Middleton didn't direct her inquiries to water on the Friday or the Saturday, May19th and 20th, 2000.

Middleton Feb. 26/01 106:23-107:8

500. In addition, Stan Koebel told Dave Patterson that there was new water main construction and that they had initiated a new chlorinator. Dr. D'Cunha indicated that these facts would increase his interest in water in investigating the outbreak, including asking questions such as "is the chlorinator working" and "what is the residue chlorine level?"

D'Cunha June 28/01 163:7-17

501. Another possible question, (not put by health unit staff) would have been "have you had recent lab results and what did they show?"

D'Cunha June 28/01 167:23-168:9

502. However, as reviewed in the evidence in the next section of CWC's argument, these types of questions were not asked by Mr. Patterson or Mr. Schmidt of Mr. Koebel until May 23rd, 2000.

### II.F.6. Health Unit Reliance on PUC Staff Assurances

503. The health unit staff evidence is that they relied on PUC staff assurances about the safety of the water. They may have so relied, but CWC submits that this reliance was not reasonable given their responsibility for the outbreak investigation, their expertise in public health, and all of the information that they had. Furthermore, this reliance was not reasonable based on the questions and inquiries that they did and did not make. This does not excuse Stan Koebel from failing to contact the MoE and health unit immediately on May 17th; nor from passing this information on to health unit staff upon their calls to him on May 19th. Nor does it excuse A&L laboratory from failing to provide the adverse results to the MoE as provided by the ODWOs. However, the public health unit has responsibility for judging potability of drinking water in the community and for outbreak investigations. Therefore, CWC

submits, the health unit has independent responsibility to investigate likely sources and to verify information on which it relies.

504. The health unit staff did not ask for nor see lab results from the PUC showing that water samples were "fine" at the critical dates. Mr. Schmidt's evidence was that he did not ask Mr. Koebel for any water test results during his discussions with him on May19th of May 20th, 2000. With the benefit of hindsight, if he had it to do over again, Mr. Schmidt would ask at least what the latest water test results were. The evidence of Mr. Patterson is that what he asked Mr. Koebel was "was there anything unusual that had happened recently with the Town's water system" (to which Mr. Koebel advised about main construction and flushing) and later in the call, asked whether Mr. Koebel think the weather (heavy rain and flooding) could have impacted the system. Mr. Patterson did not ask about recent water sampling results. Mr. Koebel advised that the well head "usually" samples 0-0. Mr. Patterson did not ask to see recent sampling results, nor inquire about the most recent results in his conversations with Mr. Koebel until Tuesday, May 23rd, after the health unit samples returned adverse. This is the first time a direct question was posed to Mr. Koebel by health unit staff, from the time it began investigating the outbreak, as to when were the last bacteriological tests and what were the results of those tests.

Patterson Dec. 11/00 64:10-66:22; 136:12-137:2
Schmidt Dec. 15/00 294:19-295:10

**Recommendation: In investigating an outbreak that may be waterborne, health unit staff should immediately obtain copies of the most recent bacteriological results for the supply, as well as review other recent records and a data base of results for that community.**

505. When the health unit staff decided to take its own chlorine analysis in the Walkerton water; the staff person did not have a proper municipal water chlorine analyzer, but rather had a swimming pool test kit. Mr. Patterson testified that "we are in the business of inspecting swimming pools, we are in the business of monitoring chlorine residuals in swimming pools. We are not in the business of monitoring chlorine residuals in Municipal supplies." Mr. Patterson relied on the numbers reported to Mr. Schmidt by Mr. Koebel, even though Mr. Schmidt's monitoring could not detect a chlorine residual, albeit with a kit with a detection level of 0.5 ppm.

Patterson Dec. 11/00 89:12-90:2

**Recommendation: Health unit inspectors should be equipped at all times with the necessary equipment and supplies for monitoring chlorine residuals and taking independent samples of municipal drinking water supplies.**

506. Bev Middleton of the health unit advised Dr. Hallett and Mother Teresa School that she was unaware of anything going on in Walkerton and even was "not aware there was anything wrong with the Walkerton water" on May 19th, 2000, even before she had any communication with other health unit staff about PUC "assurances" regarding the water. At the time of these earlier conversations, she was aware of Dr. Hallett's patients and of the Maple Court Villa illnesses and became aware of increased school absenteeism throughout the day. She knew of the range of ages affected (young and elderly) and ought to have appreciated the strong Walkerton connection at that time. Furthermore, being asked questions about the water in itself ought to have raised her suspicions and immediately directed serious health unit investigation in that regard. Furthermore, Ms. Middleton confirmed that as of Friday, May 19th, 2000, and before Dave Patterson phoned the PUC, she was looking toward a "non-food" mode of transmission because of the varied ages of the ill population. By that date, she ruled out several food sources (including hamburger) as likely because children and the elderly eat different foods. She had an "uneasy" feeling abou the water by the evening of May 19th.

Middleton Feb. 26/01 36:11-41:7; 42:7-43:17; 96:9-97:1; 105:17-106:5

**Recommendation: Health units should consider issuing a Boil Water Advisory immediately in a case where it is investigating an outbreak in a community for an illness that may be transmitted by drinking water (treated or untreated) whenever the immediate and initial information shows a broad community outbreak, separate ages impacted (such as young and elderly), and possible connection to the geographical area served by a drinking water system. Health units should not await confirmation of the source nor even probability of the source because of the very large numbers of people in the community constantly exposed to drinking water. A precautionary Boil Water Advisory should be issued based on even a possibility that it is the drinking water.**

See also Exhibit 389, Tab 7 (D'Cunha Witness Book) Public Health Branch, Draft Protocol for the Issuance of a Boil Water or Drinking Water Advisory, June 2001

507. The health unit staff passed on non-verified PUC "assurances" (based on discussions which were assumed to be assurances by health unit staff), to institutions and the public for three days, for example, to Bruce Lea Haven; to the emergency department of the hospital; to a parent; to media and to others, including on broadcast media), and in fact discouraged some of those who queried from boiling their water by saying that it was not necessary, or that if there had been a water problem, it was likely gone now.

Middleton Feb. 26/01 43:25-45:2 (Bruce Lea); 50:17 – 52:1; 53:14-22 (Emergency); 84:20-85:14; 100:21-101:3

McQuigge Jan. 10/01 236:12-14; 238:10-239:6 (media)
Patterson Dec. 11 73:6-11 (Bruce Lee Haven); 80:21-81:24 (a parent); 943:2-12 (CKNX); Dec. 13 163:18-166:22; 181:22-182:18

508. Even in discussions with institutions and others over the first weekend of investigation, Ms. Middleton did not advise them that water was being investigated as a cause or a possible cause. Other institutions presumably relied on these conversations and accordingly did not take any precautions with the water.

Middleton Feb. 26/01 114:22-115:13

**Recommendation: In communications with the public, in addition to publicizing the fact that an outbreak is being investigated, health unit staff should advise as to the sources that are being investigated, and should not advise that boiling of water is not necessary unless and until contaminated drinking water has been definitively ruled out as a source based on verified and reliable evidence obtained by the health unit.**

509. There was an error and a delay in advising institutions about the Boil Water Advisory, even after it was issued, for example, in the case of Maple Court Villa and Bruce Lea Haven, because Ms. Middleton did not recall she was to do so. She later agreed this was an oversight on her part. Institutional notification of the Boil Water Advisory will be discussed further in a later part of this argument.

Middleton, Feb. 26/01 63:18-64:1; 113:4-12

## II.G. MEDICAL TREATMENT

### a) Admission Policy

510. The South-Grey Hospital Centre has four sites located a Chelsey, Durham, Kincardine, and Walkerton. The health centre is an amalgamation of four hospitals. There are thirty-three health care and five chronic care beds for a total of thirty-eight beds in Walkerton Hospital. There are eight general practitioners who have privileges to work at the Walkerton site.

Waram, January 19, 2001,95:15-100:7

511. The Medical Advisory Committee for the Walkerton Hospital, which consists of six independent practitioners with privileges to practice at the hospital, the CEO and the Director of Patient Care has responsibility for making recommendations to the hospital board regarding guidelines and protocols regarding medical care. The Medical Advisory Committee is also responsible for making recommendations to the hospital board regarding the quality of care provided by the physicians.

Waram, January 19, 2001, 101:13:103:7

512. The Medical Advisory Committee at the hospital had a protocol to address a gastrointestinal outbreak of unknown origin and the protocol was applied to the E.Coli outbreak in Walkerton. The protocol centered on investigating the cause of an outbreak and applied only to the patients who had been admitted to the hospital. Neither the Walkerton Hospital nor the Medical Advisory Committee had any treatment guidelines or protocols to address an E.coli.0157 outbreak

Waram, January 19, 2001, 102:20- 103:25

513. All decisions about governing the appropriate treatment for patients were to be dealt with by the physician while the hospital's role was to provide the services necessary to carry out the treatment.

Waram, January 19, 2001, 104:2-103:25 102:25

514. The Walkerton Hospital did not turn anyone away during the crisis because of a lack of beds. In fact the hospital had available beds every day of the crisis. The decision to admit or refuse admission was a medical decision, which was left to be determined by the physicians. During the crisis there were thirty-five in-patient admissions related to E.coli and campylobacter during May, January and July.

Waram, January 19, 2001 115:11- 116:6

**b) Resource Impacts**

515. There were seven hundred and twenty-five visits to the emergency room, which were attributable to the E.coli crisis, which represents a 66 percent increase from normal use. In May 2000, there were one thousand eight hundred and twenty-nine visits, which represents a 39 percent increase from the normal number of visits. The use of lab resources also increased in May 2000 by 45.1 percent, in July by 22.4 percent, and in August by 30.8 percent. The hospital had to refer out stool samples by May 24, because the volume was beginning to affect the lab's ability to work. There was also a significant increase in the number of blood samples and the number of emergency room calls related to inquiries about steps to be taken to deal with diarrhea and vomiting and the Boil Water Advisory. The hospital was able to deal with calls to the emergency room because it had excess staff who were deployed to respond to the calls.

January 19, 2001, Waram, 118:23- 130:3. 123:23- 128:5.

**c) Treatment Policy**

516. On the morning of May 20th, Cathy Amburn, the Nurse Supervisor, called Bev Middlteon for the Health Unit and advised her that the Walkerton Hospital had been receiving a large number of calls and there were rumors about bad water in Walkerton. Ms. Middleton advised Ms. Ambrun that the PUC had advised the water was "okay" and recommended as treatment that people drink lots of fluids and take gravol and Tylenol and not to administer anti-diarrhea drugs. Ms. Middleton also stated it was not necessary to boil the water. She also confirmed one case of E.coli and said that young children or the elderly might need hydration if they had severe symptoms

Waram, January 19, 2001, 131:1- 133:9

517. The Public Health Unit also sent faxes on May 20th consisting of an information sheet on E. coli and information on treatment dilemmas regarding antibiotic use. Cathy Amburn discussed the issue of prescribing antibiotics with the physicians on call and the Hospital advised the local drugstore not to dispense anti-diarrheals.

Waram, January 19, 2001, 133:10-130:22.

518. The hospital staff talked to the Health Unit on five occasions during a forty-eight hour period commencing May 20th, and during this time no one from the Health Unit advised the Walkerton Hospital that the water was under active investigation by the Health Unit as a potential cause of the outbreak. In fact, on two occasions during the forty-eight hours, Ms. Middleton had specifically told Ms. Amburn that it was not necessary to boil the water. The Hospital had started receiving phone calls on Saturday, May 20th from the public regarding the safety of the water and had responded by advising these callers that the Public Health Unit had advised there was no known problem with the water. The Hospital was never advised by the Walkerton PUC or the Town of Brockton of adverse water test results prior to the Boil Water Advisory. Furthermore, a representative of the Hospital did not call either the PUC or the Town of Brockton prior to the imposition of the Boil Water Advisory to inquire about the safety of the water.

Waram, January 19, 2001132: 23- 142:7.

519. Upon being advised of the Boil Water Advisory the Hospital requested that the Building Services post signs on the drinking water fountains and ice machines and requested that an alternate water supply be obtained. In addition, the Food Services Department was requested to discard all foods that had been in contact with water and bottled water was delivered to the patient care. The Hospital also took special measures for laundry, and a chemical disinfection system was used as opposed to a water-based system.

Information fact sheets were also prepared and distributed to hospital staff on how to deal with issues relating to water. The hospital staff did not tell members of the public who called about the Boil Water Advisory, but when they gave advice regarding fluids they indicated the water should be boiled or alternatively, bottled water should be used. A public nurse was also stationed at the Walkerton Hospital to answer questions from the public.

Waram, January 19, 2001, 142:11- 145:19:147:71- 148:19;152: 3-153:10

520. The hospital had a disaster plan but decided not to invoke it in full because it was not designed to deal with an epidemic. Furthermore, it does not appear that the Hospital had a protocol in place to undertake precautionary measures to deal with a suspected epidemic before a Boil Water Advisory was in effect. The hospital also did not make any effort to contact patients who had symptoms consistent with exposure to E.coli but who had not been admitted to the hospital to advise them of the appropriate treatment, once it was aware of an E.coli outbreak.

Waram, January 19, 2001, 155:5-156:7

**Recommendations:**

**The Walkerton Hospital should prepare an emergency plan to specifically address an outbreak of E.coli.The emergency plan should be prepared in consultation with the Public Health Unit, the Ministry of Health, the Ministry of Environment and the Town of Brockton and include the following:**

- **guidelines for admission of patients if an E.coli outbreak is suspected;**
- **protocols for ensuring that information is shared expeditiously and accurately between the hospital and outside agencies such as the Public Health Unit;**
- **protocols on ensuring for referral of patients to other hospitals if required;**
- **protocols on how the hospital would handle phone calls from the public regarding the outbreak;**
- **protocols about how to ensure the public and pharmacies are given timely and accurate information on the method of treatment; and**
- **protocols on housekeeping, obtaining alternative water supply, and disinfection procedures and posting of notices within the hospital.**

## PART III – SYSTEM FINDINGS AND RECOMMENDATIONS

## III.A – MULTI-BARRIER PROTECTION OF DRINKING WATER

521. Drinking water protection requires a multi-barrier approach. Drinking water systems must not rely on only one or few barriers. An important aspect of a multi-barrier approach to safe drinking water was described by Dr. Hukowich as the necessity of having "multiple pairs of eyes and multiple hands that go up at the first concern, because not everybody shares the same concerns about the same particular issue…"

Huck Vol. 1, 107:17 - 109-20 ; Huck Vol. 1, 111:11-12; Huck Vol. 1, 150:3-23
Hukowich July 4/01 198:19-199:22

**Recommendation:**

**Multi-barrier drinking water protection must include a robust emphasis on at least five elements of the system: source protection, water treatment, distribution, monitoring and response to adverse monitoring results. Furthermore, this system and all of the elements within it must be able to withstand "upsets" to the system.**

Huck Vol. 1, 107:17 - 108:8 ; Huck Vol. 1, 111:7-25

522. This section of CWC's submission draws on the argument and evidence reviewed in the other sections of the argument. Although some evidence is specifically cited here, (particularly the "overview evidence" adduced at the outset of the Inquiry), most of this section consists of recommendations, the evidence for which is in other parts of this argument.

### III.A.1 Source Protection

523. Contamination can enter groundwater long before it gets to the well. Contamination can enter a well and distribution system through the underlying aquifer (the water that the well draws). Sources must be protected.

Huck Vol. 1, 111:5-12; Howard Vol. 1, 81:24 - 82:3

524. Ontario "got out of the business of mapping our aquifers and monitoring water levels...somewhat got behind the game in terms of understanding where our water is, understanding our groundwater, how much is getting in, how much is getting out, understanding how our systems work...Ontario does not manage water; Ontario simply issues water taking permits which is like writing cheques on my bank account when I don't know how much money is coming in every month and how much is going out to pay... the other bills...There's no reason at all we can't get to the stage of managing our water, but we are a little behind the game certainly in Ontario."

Howard Vol. 1, 103:6 -104:14

**Recommendation:**

**Ontario must map its aquifers and water tables and monitor water levels extensively. Ontario must analyze recharge and discharge conditions for aquifers. Ontario must create reports on the data thus acquired, which must be made publicly available and accessible. Ontario must manage its groundwater and must cease issuing water taking permits without this information.**

Howard Vol. 1, 103:6 - 104:14

**Recommendations:**

**The best quality source for a municipal drinking water supply that can be found should be obtained. Then a watershed protection plan should be imposed.**

Huck Vol. 1, 111:12-15

**All municipalities relying on groundwater should be required to define the source of their supply wells' water; all municipalities should be required to evaluate land use within that area and to initiate land use controls to protect that source.**

**The zone around a well from where the water is coming to the well should be investigated and mapped. One approach to doing so is to develop a wellhead protection area. In any event, the zone of contribution should be identified, that is the area in which water entering the groundwater system vertically downwards will end up in the well. Zones of transport should also be identified (each contour indicating the time for the water from that zone to be transported to the well).**

Howard Vol. 1, 83 - 85

**Land use controls should be imposed within zones of contribution to protect the water source for the well. In doing so, appropriate margins of error must be allowed to account for the fact that they system is dynamic. As additional wells are contemplated or pumped and affect the mapped well, the zones of contribution and transport time must be re-evaluated, and as necessary, land use controls modified.**

Howard Vol. 1, 86: 1-3 ; Howard Vol. 1, 88:1 - 89:7 ; Howard Vol. 1, 95:18-24; Howard Vol. 1, 96:13-22

**There should be a provincial source protection policy. This should include overall water management goals and objectives. Source protection should be given priority in land use planning legislation. The overall provincial source protection policy should be implemented in legislation.**

**There is a need for the province, municipalities and conservation authorities to have effective legal tools, and requirements to establish and implement source protection measures according to the risks in that watershed or aquifer catchment area. Municipal and provincial tools to deal with source protection vis-a-vis risks from agriculture, cattle and farming should be established. Broader source impacts – for example from development; interference with wetland function and others, must be integrated into the approach.**

**The source of municipal drinking water, once established, should be periodically reviewed. Pre-existing and new risks should be evaluated with appropriate changes to the monitoring requirements or practices; to treatment and to other aspects of a multi-barrier protection approach in place for the system.**

### III.A.2. – Monitoring

525. Two types of monitoring are required in drinking water systems: process monitoring and water monitoring, both raw and treated.

Huck Vol. 1, 143:12 - 144:8

**Recommendations:**

**All municipal supply systems, both ground and surface water, must be required to monitor flow, chlorine residuals or other disinfection parameters, and turbidity.**

**All municipal supply systems must monitor for pathogens in both the raw and treated water; and the latter at geographically diverse points around the distribution system.**

Huck Vol. 1, 143:12 - 145:18; 146; 1-5

526. Historically, smaller systems have been required to monitor for pathogens less frequently than larger systems.

Huck Vol. 1, 145:24 - 146:1

**Recommendation:**

**Smaller systems should be required to monitor more frequently so as to minimize the time during which pathogens may be present in the system and consumed by people before they are detected.**

**Recommendations include the need for mandatory monitoring, not only for indicator organisms that might indicate the presence of pathogens, and chlorine or other disinfectant residuals, but also for turbidity and other indicators of surface**

**water influence of ground water sources. Examples of such indicators include spore formers, conductivity, pH variances and disinfectant residuals.**

Gilham Mar. 1/01 169:25-170:7 (relying on Palmateer)
Payment & Huck Mar. 1 / 01 90:7 – 93:10; 93:4-96:13

**Recommendation:**

**The ODWO recommendation to subject 25% of drinking water samples to the heterotrophic plate count test was developed to give the operator and oversight agencies some indication of the cleanliness of the drinking water system. This monitoring should continue.**

Palmateer Vol. 4, 27:1-10

527. Operators require better training and an understanding of the reasons for monitoring, disinfection, treatment and of what it is that they are monitoring, as well as the circumstances which can affect the results. It is relatively easy to contaminate samples when collecting them or when testing them, through improper procedures. This may result in "false positive" sample results, thus making it difficult for the operators, the public and oversight agencies to judge the safety of the supply. This is elaborated upon in the training section later in the argument.

Huck Vol. 1, 148:5-21

**Recommendation:**

**All water works staff, including any staff handling sample bottles before and after collection and transport, as well as all laboratory staff, must be required to pass rigorous training in the proper protocols for collecting and handling samples. Such training must include explanation as to the importance of the sampling and the consequences of unreliable sampling in terms of public health and safety.**

528. Test results for microbiological testing are not immediate; the time required to culture the samples results in a delay of some days before the lab determines that there is contamination in the water supply and conveys the advice to the operator, MoE and the health unit.

Huck Vol. 1, 148:22 - 149:13
Payment Feb. 28/01 106:15-17

**Recommendation:**

**Methods to increase the speed of detection of pathogens, as well as the precise type of pathogens should be pursued; Ontario should provide research funding to assist**

**with development of more rapid and more precise detection methods. Tests that provide faster results must be developed.**

Palmateer Oct. 19/00 17:21-23; 79:19-80:10; 96:24-97:16
Payment Feb. 28/01 12:13-17; 28:3-11

**Recommendation: Continuing assessment and re-assessment of bacteriological drinking water risks and new and more reliable methods of pathogen detection must be constantly evaluated and incorporated into provincial drinking water regulation. Monitoring requirements in the province did not (and do not) require testing for actual pathogens. There are many reasons for this, including the time required for such testing results; the cost of such tests; and the very small statistical probability of finding pathogens in small, relatively infrequent volumes of drinking water, even when they are present. However, the lack of monitoring for actual pathogens in drinking water (such as actual pathogenic bacteria; viruses and parasites) and in source water means that the risk from such pathogens may not be understood by operators or by policy makers. Accordingly, along with the lack of transmission of scientific research and new information about known and emerging pathogens, treatment protocols and other protective measures may not be perceived as necessary. The result is a system that is perceived as relatively static – i.e. the risks are assumed to be known and contained with the existing system or with the particular water works system.**

### III.A.3. Sampling

529. Frequency of sampling should be increased to provide a statistical expectation of finding microbiological indicators of contamination when they are present. For example, in the case of the health unit's sampling of the Walkerton water on May 21st, only 2 of 20 samples taken had adverse results. Taking only 3 samples that day may well have failed to indicate the continuing bacteriological contamination of the Walkerton water supply on that date. In addition, it is imperative that sampling locations be distributed throughout the geographic extent of the water system.

Patterson Dec. 13/00 224:1-224:20

530. GAP laboratories did not observe a serious health problem with Walkerton water over the years it did the sampling because in no case did re-sampling result in another adverse result. GAP relied on the re-sampling results in reaching its conclusion.

Palmateer Oct. 19 133:15-20

**Recommendation: Re-sampling procedures should be made more stringent so that it is ensured that the re-sampling occurs immediately and is at a minimum taken**

**from the same location as the adverse sample that was observed. "Re-sampling" by waiting for the following week's routine sampling is not acceptable.**

D'Cunha June 28/01 77:16-78:8

### III.A.4 – Treatment

531. Groundwater can be under the influence of surface water; that is, the surface water can very quickly enter a well withdrawing groundwater.

Huck Vol. 1, 112:12 - 113:6

**Recommendations include developing faster responses to indicators of groundwater influenced by surface water. Multi-barrier treatment systems should be imposed even for groundwater systems.**

Payment Feb. 28/01 71:9-19; 75:12-23

532. In case of such indicators, protocols and contingency plans should be in place and well understood by operators. For example, protocols could include temporary cessation of that well supplying a community, addition of a standby treatment process, and other measures.

533. All municipal supply wells should be stringently evaluated, and periodically re-evaluated for evidence of influence by surface water. In case evidence of surface water influence is found, these wells, at a minimum, should be required to impose treatment for the well supply as if it was a surface water source.

Huck Vol. 1, 113-117

534. As discussed in section II.B.5 above, chlorination is not effective in case of high turbidity because of chlorine demand from the organics making up the turbidity.

535. Furthermore, chlorination is not as effective in dealing with parasites or viruses entering the system as it generally is for bacterial pathogens. Even bacterial pathogens can survive chlorination for various reasons such as being sheltered by biofilm or particles, receiving too low a dose of chlorine, or being able to resuscitate in the human gut. Chlorination does not "sterilize" the water; it does not kill all microorganisms that can cause illness and disease. Viruses are more difficult to eradicate with disinfection even than bacteria and protozoa more difficult still.

Huck Vol. 1, 123:4 - 124:19

**Recommendation: Municipalities should utilize multiple disinfection methods to ensure the maximum safety of the water from dangerous microorganisms. A combination of treatments could include chorine, ultraviolet radiation, ozone, and various filtration systems.**

Huck Vol. 1, 123:6 - 125:19

**Recommendation: In considering disinfection methods, municipalities should maximize the safety of drinking water, both at source and through the distribution system, and both from short-term acute pathogen risks and from long-term risks such as carcinogenic trihalomethanes formed from the interaction of chlorine and organic matter in the water.**

Huck Vol. 1, 129:15-25

**Recommendation: Ontario should invest significantly in water treatment research and in identifying new pathogen risks.**

Huck Vol. 1, 132:1 - 133:4

536. For systems regularly influenced by pathogens or by surface water indicators, treatment options should be added or alternative supplies considered.

537. As discussed above in section III.A.3 and II.B.1, continuous monitoring of certain parameters, repeated source assessments, as well as re-visiting approvals requirements should become mandatory.

538. In the past, a precautionary approach has not been taken in determining what kind of water treatment is needed for a system. There has been no required periodic re-evaluation of sources and risks to a drinking water system and accordingly, no required re-evaluation of changes to a Certificate of Approval. An example of such re-evaluation could show that a groundwater source not originally treated as subject to surface water influence does in fact over time demonstrate such influence and therefore requires more stringent protection measures.

**Recommendation: a precautionary approach to the drinking water system must be institutionalized so that all of those exercising their roles consider what is the safest course of action to protect community health, especially in the case of uncertainty. The culture should be shifted away from one of waiting for "proven" or "confirmed" evidence of risk, to one of taking a protective or precautionary approach. The discussion in this section provides only a few examples of the differences that might result from such a shift.**

## III.A.5 – Distribution; Water Works Standards, Including Wells; Distribution System, Including Maintenance

539. Distribution systems historically were designed primarily from the perspective of hydraulic flow and pressure, and without similar regard for water quality in the distribution system.

Huck Vol. 1, 138:24 - 139:14

**Recommendation: New distribution systems should be designed to include water quality considerations and existing distribution systems should be reviewed and retro-fitted to take account of water quality considerations such as water age management.**

Huck Vol. 1, 139:22-25

**Recommendation : Dead ends in a distribution system should be eliminated so that there is flow throughout all aspects of the system at all times.**

Huck Vol. 1, 140:1-13

540. Other opportunities for contamination of a supply through the distribution system include loss of pressure when leakage can occur from outside to inside the pipe, thus providing a source of contamination, water main breaks, cross-connections of pipes from other systems to the water distribution system, and new main construction.

Huck Vol. 1, 41:2 - 143:11

**Recommendation: Ontario's regulations and standards and water works operators practices must be stringent to ensure that municipalities monitor pressure throughout the distribution system to rapidly detect loss of pressure or breaks, monitor water tables near water mains, actively hunt for and eliminate cross-connections, rapidly repair breaks with appropriate safeguards, and scrupulously follow standards for new main construction and disinfection.**

Huck Vol. 1, 141:2 - 143:11

541. Province-wide, mandatory municipal distribution system standards (for example main sizes, numbers of dead ends, flushing, pressure monitoring, cross-connection elimination and other such matters) should be mandatory.

542. Sampling locations should be rotated on a systematic basis so that distribution system problems are better discovered.

543. E. coli 0157 can survive in a biofilm with over 2400 times more resistance to chlorine than if it were floating freely in the water.

Palmateer Vol. 4, 84:2-18

**Recommendation: Procedures to eliminate biofilm (such as ensuring no dead ends, regular flushing and regular swabbing) should be developed and mandated to be conducted by every water works distribution system operator.**

544. Supply wells can be subject to contamination at or close to the well head.

Howard Vol. 1, 78:3-9

**Recommendation: Supply well standards must include the following, and all municipal supply wells should be re-examined to ensure they comply with these standards within a specified period of time:**

- **Well casings must protrude well above ground level;**
- **Ground slope must be maintained away from the well head;**
- **Annular spacing between the well casing and underlying bedrock formation must be completely filled with sealing material;**
- **Well casing should extend as far into the underlying bedrock formation as possible; normally a grouted casing to at least 6 metres; much more may be necessary according to the characteristics of the rock;**
- **Well head must extend above the base of the pit, normally at least 30 centimetres;**
- **A sanitary well seal must be maintained on top of the well; and**
- **All joints or pipework entering through the side of the well pit must be sealed with an effective waterproof seal.**

Howard Vol. 1, 99:18-22; Howard Vol. 1, 78-81

545. Walkerton did not have or propose to have an automatic chlorine residual analyzer for its water supply wells.

Hallahan Vol. 19, 137:3 - 12

**Recommendation: Groundwater supply wells under the potential influence of surface water should be required to have automatic chlorine residual analyzers, along with automatic alarms and operator notification procedures.**

546. Note: Notification of adverse results is also an important element of multi-barrier protection of a drinking water supply, but has been discussed earlier in this argument, and will not be repeated here.

## III.B. RESOURCES

### Resources - General

547. There is much evidence that the Ministry of the Environment endured significant downsizing from the early 1990s to the close of the decade.

### Overall Reductions:

### 1985 –1995

548. Even before the major cuts in the post-1995 era, the MoE had experienced significant reductions. This analysis was outlined in the document: "Historical Analysis of Ministry of the Environment and Energy – Estimates 1985-1995, May 3, 1995." Page 1 of the document notes that since 1991-92, the combined estimates of the Ministries of the Environment and Energy have fallen 30% in 1995-1996 as a result of government wide fiscal restraint measures. The Ministry was funded at about $406 million in 1991/92, which fell to about $331.4 million in 1995/96.

Exhibit 330B, tab 5; Castel, May 15, 2001, p. 61

549. When Mr. Castel was then asked about the 30% reduction, he acknowledged the cuts but also noted that the reductions encompassed transfers. Clearly one of the big effects on the declining MoE budget during the 1990s was the divestment from MoE of the sewage and water facilities to the Ontario Clean Water Agency. However, these numbers neutralized the impact of the transfer to the Ontario Clean Water Agency and have an adjustment of inflation.

Castel, May 15, 2001, p. 60 and p. 62

550. However, at page 15, the report notes that the major reductions in division allocations were gained primarily through reductions in ODOE (other direct operating expenses), capital and operating transfers. Except for reductions achieved through the integration of the two ministries and some expenditure reductions, funded positions were relatively unaffected by cuts up to 1994/95.

Exhibit 330B, tab 5; Castel, May 15, 2001, p. 64

551. However, ADM Sheila Willis provided some context for these pre 1995 reductions. In a memo to Deputy Minister Richard Dicerni on October 12, 1994, she noted:

552. As you are aware Operations Division has undergone a number of FTE constraints in past months during which the total staff allocated to the division has been reduced from 1043 to 908 (i.e., by 135 positions by March 1995).

553. Obviously, these staff reductions will have significant impacts to the manner in which this Ministry does business. Less than 15% of the MOEE staff are located in the District Offices. The reductions in staffing will further erode this relatively small contingent of front line staff.

Exhibit 287, Tab 30; Shaw, April 23, 2001, pp. 32-34

**1995-2000**

554. Exhibit 330C (Tab 8), a document entitled "Fiscal Plan to Meet Near Term and Future Resource Reductions", outlines the near term and future resource reductions. The basic reduction targets are as follows:

| | |
|---|---|
| 1995/96 | $30.8 million reduction |
| 1996/97 | 40% reduction |
| 1997/98 | 20% reduction |

Castel, May 15, 2001, pp. 76-77

555. During the introduction to the evidence of Mr. Castel and the Fiscal and Planning Branch panel, there was an outline of the reductions.

| | |
|---|---|
| 1995/96 | $30.8 million reduction<br>$24.6 million reduction from water and sewage grants to OCWA |
| 1996/97<br>1997/98 | $200.8 million reduction<br>$ 13.5 million reduction additional base review |
| 1998/99 | $5 million in efficiency operating constraints |
| 1999/2000 | $4.8 million in efficiency operating constraints |

Castel, May 15, 2001, pp. 12-13

556. The total reductions are over $254 million in addition to another $19.4 million for Interim Waste Authority and Environmental Technology Fund reductions.

557. On May 22, 1996 and January 14, 1997, there were some staff reductions totalling 752 positions.

558. Exhibit 331, entitled “Annual Comparison of MoE Staffing Levels (1990-1991 through 1999-2000 where available), outlines the relative staffing levels representing “Staff-on-Board,” “Population Reports” and “Headcounts.” Although there are variances between these three methods of reviewing staff reductions, the result is essentially the same.

**1990-2000**

| | | | |
|---|---|---|---|
| Staff-on-Board | 1990-91 | 3019 | |
| | 1999-00 | 1393 | |
| | | | 54% reduction |
| Population Reports | | | |
| | 1992-93 | 3038 | [1990-91 not available] |
| | 1998-99 | 1418 | [1999-00 not available] |
| | | | 53% reduction |
| Headcounts | | | |
| | 1990-91 | 3229 | |
| | 1999-00 | 1374 | |
| | | | 57.5 % reduction |

**1995-2000**

| | | | |
|---|---|---|---|
| Staff-on-Board | 1994-95 | 2296 | |
| | 1999-00 | 1393 | |
| | | | 39% reduction |
| Population Reports | | | |
| | 1994-95 | 2208 | |
| | 1998-99 | 1418 | [1999-00 not available] |
| | | | 36% reduction |
| Headcounts | | | |
| | 1994-95 | 2208 | |
| | 1999-00 | 1374 | |
| | | | 38% reduction |

559. Regardless of the way the reductions are calculated, there has been over a 50% reduction to MOE staff since the early 1990s and somewhere between a 36% to 39% reduction between 1995 and 2000.

560. While there is further discussion of these reductions below, it is important recognize the fundamental downsizing that occurred throughout the 1990s and particularly since 1995.

561. It is always difficult to relate in a causative way generic budget and staff reductions with specific events like the Walkerton tragedy. However, it is important to make a number of points:

- Even at a generic level, one could argue that reductions of this magnitude have to affect the operation and delivery of services. This is not a large leap of logic in light of the historical roles and responsibilities of the MOE; and

- There is ample evidence showing that there were increasing demands on the Ministry and increasing workloads on MoE staff. As such, even if the budget levels remain constant, capacity problems would still arise owing to increasing demands.

562. Simply put, the issue is whether, in light of the nature and size of the cuts, the MoE could fully deliver on its mandate.

Earl, Oct. 30, 2000, p. 129-132, 250-251
Earl, Oct. 31, 2000, p. 52-56, 71-72
Merritt, April 12, 2001, p. 160
Struthers, Oct. 26, 2000, p. 79
Shaw, April 19, 2001, p. 160

**Resources and the Operations Division**

563. The Operations Division of the MoE is the key frontline delivery mechanism for the protection of Ontario's environment.

564. The Operations Division of the MoE was certainly not immune from resource and staff reductions. According to the evidence, the resource reductions included:

- Phase 1 Reduction - $12.6 million (reducing their budget from $76.9 to $64 million)
- Phase II Reduction – $53.4 million (reducing their budget from 67.9 to 53.4 million)

565. From 1995/96 to 1997/98, the Operation Division was reduced by approximately 229 staff, although the reduction target was initially 279 staff. Hence the staff was reduced from approximately 935 to 706 staff (although the number of 655 is used also at Tab 43 of Exhibit 287). Nevertheless, this still represents a reduction in staff of somewhere in the range of approximately 25 to 30% There were over 1,000 staff in this division in 1992/93.

Shaw, April 23, 2001, pp. 97 and 133; Exhibit 287, Tab 38 and Tab 37; Tab 43

566. In terms of budgets, the division was reduced from a base year initially of approximately $76.9 million in the 1996/97 fiscal year to approximately $53.4 million for the 1997/98 fiscal year.

Shaw, April 23, 2001, pp. 92-98; Exhibit 287 –Tab 43

567. These budget and staff reduction had real life, on-the-ground impacts. These included:

- Closing of the three regional labs in Thunder Bay, London and Kingston with a loss of 50 staff ;

Shaw, April 23, 2001, p. 87

- A reduction of 20 staff from the Investigations and Enforcement Branch;

Shaw, April 23, 2001 pp. 135-36

- The elimination of some 37 Environmental Officers' positions.

Exhibit 287 Tab 41

568. While there remain some uncertainty of the precise numbers, the essential message is the same. The numbers referred to above represent what can only be referred to as dramatic reductions to frontline personnel of the Ministry. These reductions must have affected the basic ability and capacity of the Ministry and its staff to fully discharge its responsibilities.

569. The dilemma was put this way with the examination of Mr. Shaw.

Q..Yet when I look at the reduction of thirty-seven Environmental Officers, it would seem to be counter-intuitive what's going, their workload would be going up, yet in terms

of Environmental Officers, or those front line people, I would regard that as reduction.

Can you attempt to reconcile that in any way?

A.. No, sir, I can't, other than my previous statement that one of the driving principles under – underneath these reductions was to – was to minimize the reduction on our front line staff…

Shaw, April 23, 2001, pp. 134-35

570. According to Mr. Shaw, "the staff were demoralized at this point in time." He further acknowledged that there was an impact on the delivery of the MoE's services and noted that "the impact on delivery was more on the proactive or preplanned activities."

Shaw, April 26, 2001, pp. 128-29

571. As discussed elsewhere in this submission, the nature of these cuts led to a number of serious concerns by staff. These included reduced capacity in terms of environmental monitoring, staff support to the IEB, and of course staff reductions. Mr. Shaw agreed with respect to the legitimacy of these possible impacts.

Shaw, April 23, 2001, pp. 124-25; p. 160

572. Mr. Shaw acknowledged that senior staff knew about the implications of such cuts.

Shaw, April 26, 2001, p. 127

**Resources and Communal Water**

573. From a programmatic point of view, communal water lost both its priority and focus within these cuts. This position is best reflected in the nature of the reductions. There was an over 50% reduction with respect to staff resources from 1996 to 2000. In the fiscal year 1996/97, there were some 24.7 staff as compared to some 12.81 by 1999/00.

TAB 17 of Exhibit 287 (Table 2) p. 62 (MOE Year End Work Plan Support Document – 1999-2000); Also see: Shaw, April 26, 2001, pp. 93-94; Shaw, April 19, 2001, p. 177.

Findings

MoE endured severe budget cuts from the early 1990s with the most severe cuts occurring since 1995.

The reduction in staff and resources directly and indirectly affected the ability of the Ministry to carry out its mandate. This finding is supported by findings particularly with respect to issues of inspections and enforcement and Ministry oversight pertaining to municipal water systems.

During the era of reductions, communal water systems were, at least in practice, given less priority in the Ministry as the Ministry attempted to cope with its increasing workload and decreasing resources.

**Implications for South West Region**

574. While the cuts did affect programs such as communal water programs, the Southwest region was also affected.

575. The impacts on the Southwest region can be summarized as follows:

- The Owen Sound District was downgraded from a District Office to an Area office
- Owen Sound Office to report to Barrie Office
- The responsibility for Huron County was transferred to Sarnia
- Staff reductions in the Owen Sound office included:
    - District manager
    - Administrative person
    - Environmental Officer

576. Admittedly, it is unclear if the EO position was eliminated. Our reading of the evidence is that it was eliminated.

Exhibits 287, Tabs 40 and 41; Shaw, April 23, 2001, pp. 81-86

577. Another perspective on the matter is as follows. In January 1995, there were 14 water-related positions in Southwest Region. In January of 2000, there were 10 water-related positions. Some of this decrease is attributed to the closure of the labs. Nevertheless, it does again illustrate the shrinking focus, resources and capacity dealing with water generally and in particular with communal water matters.

Shaw, April 23, 2001, pp. 106 and 107; Exhibit 299

578. According to one report, with respect to the South West Region, staffing went from 143 in 1994 to 88 in 1999. The effect of the Ontario Clean Water Agency is neutralized.

Castel, May 15, 2001, p. 206; Exhibit 330F, tab 6

Findings

Through the reductions and changes that occurred since 1995, the Southwest region did endure budget and staff reductions.

These reductions contributed to the Walkerton tragedy by decreasing the overall capacity for staff to address communal water system issues.

**Process of Downsizing**

579. While it is important to understand and comprehend the nature, size and magnitude of the changes, it is also important to provide some comment on the process of the downsizing. From the evidence, it seems essentially the case that the reduction targets were imposed on both senior management and staff.

Shaw, April 23, 2001, pp. 130-131
Castel, May 15, 2001, p. 93
Also see: Gauthier, May 16, 2001, p. 15 at lines 13-25; p. 16, lines 17-25

580. Mr. Shaw was asked about this approach and his response is illuminating.

Q. To the best of your knowledge, the cuts – or let's say the – the targets – the reduction targets were imposed upon you, was there any needs assessment to determine what amount of money at the very core was needed to, in terms of Operations, to deliver the programs you needed? In other words, was there –

A. I –

Q. -- a broad program you were working backwards from?

A. If I – if I understand your question, everything I've presented has worked in the opposite direction. It has basically said what could we remove to – to meet these targets, you're asking me do we ever to do it the other way, did we ever try to figure out what the – the financial resource requirements were in order to do our job. And to the best of my knowledge, the answer is no, not—not at least while I was involved in these activities.

Q. Is it fair to say then, with respect to the targets, there was no input from frontline people?

A. Definitely there was not input. This information was – was not shared beyond a very few number of people.

Shaw, April 23, 2001, pp. 130-131

581. Mr. Shaw was not the only senior MoE staff who had issues with the budgeting process. Ms. Willis also had concerns with respect to both the nature of the reductions and the process by which they were pursued.

See: Shaw, April 23, 2001, p. 93; Exhibit 330D, Tab 4

582. It was quite clear from Mr. Castel that it was the role of the minister to debate the reductions within Cabinet, not that of MOE staff. According to Mr. Castel, "Once the allocation is given to the Ministry, we have to comply with it."

Castel, May 15, 2001, p. 85.

583. The implications of this approach are important and profound. The reductions were driven by fiscal policy, virtually blind to the nature and extent of the implications. This matter is further discussed in Section II.D.4, on MOE Oversight. It will suffice to note at this point that this is not the appropriate manner to institute reductions of the nature and magnitude of the reductions carried out since 1995 in light of the mandate and responsibilities of the MoE. The lack of analysis of the impacts, the lack of input from the public and MoE staff, the speed in which they were implemented, are all factors that would lead to a demoralized staff and a Ministry riveted by uncertainty and instability. Moreover, the fact that the delivery strategies were confidential and closed to public scrutiny ensured that a legitimate debate on the merits of the directions and trade-offs within the documents would never occur. It is submitted that Mr. Shaw's explanation as to why they were confidential is not a compelling reason to keep them from public review.

Shaw, April 19, pp. 174- 75

584. While the reduction allocation process was problematic, one could argue that the delivery strategies were a way to effectively assist in implementing these targets. Certainly there is much evidence on the benefits of the delivery strategies. Although Mr. Shaw disagreed with this statement, it is our submission the delivery strategies were a tool to assist with the downsizing. Dr. Winfield fully agreed with this statement. Mr. Merritt, while giving the history of the delivery strategies, asked whether the delivery strategies were a

way of dealing with less resources. He replied: "…I think it's an effective tool to do that."

Shaw, April 19, 2001, p. 170
Winfield, May 28, 2001, p. 111
Merritt, April 12, 2001, pp. 156-160 and in particular, p. 161, lines 8-12

585. Moreover, through a number of lines of questioning, it was put to Mr. Shaw that the delivery strategies effectively categorized the communal water program as a non-core or a non-priority activity. Although Mr. Shaw essentially disagreed, it is our submission that the Commission must conclude that the effective result of the delivery strategies was to distance communal water from MoE core activities.

Shaw April 19, 2001, pp. 149- 153; 171

Findings

The process to develop the budget reductions was an inappropriate one. The process of budget reductions should be based on a determination of what the Ministry needs to protect the environment and public health.

## III.C. MOE INSPECTIONS

### Inspections

586. Inspections initiated by the Ontario Drinking Water Commission, the predecessor of the current Ministry of Environment, sought to ensure that all non-Ontario Water Resources Commission facilities were to be inspected annually, with smaller facilities with less experienced operators to be given priority. The Ontario Drinking Water Commission was a central agency located in Toronto, with a dedicated group of inspectors trained to undertake inspections of water treatment plants. There were no standardized reports for inspection, however copies of the inspection reports would be forwarded to the municipality and the operating authority. The local medical officer of health would be notified in the event of adverse water samples. The inspections were generally carried out in a consultative manner and in the event deficiencies were noted, the inspectors would try and ensure voluntary compliance. The inspector would normally verify compliance in the next round of inspections

Panel-Little, Mahoney, Shaw, April 17, 2001, 43:15 - 45:22

587. In 1974, the MoE decentralized its operations and created six regions and twenty-two district offices across the province. The effect of this decentralization was that expertise, which had resided in the Toronto office,

was distributed throughout the six regions and the district offices. The responsibility for conducting inspections of municipal water treatment plants resided with the district offices. Initially when the district offices were set up, there were two groups of abatement officers, the Municipal and Private Abatement group and the Industrial Abatement group. In 1989 the two groups amalgamated into the Municipal and Industrial Abatement Group and municipal water treatment plant inspections became just one of the many types of inspections carried on by MoE district staff.

Panel - Little, Mahoney, Shaw, April 17, 2001, 45:23- 47:2

588. For approximately a decade commencing in the early 1980 the MoE did not have a prescribed frequency for inspections of municipal water treatment plants. The Ministry 's inspection would be carried out if it was contacted by an operator about specific problems. Consequently, MoE inspections evolved into a more reactive as opposed to a proactive program.

Panel - Little, Mahoney, Shaw, April 17, 2001,49:18-50:13

589. The Walkerton PUC, which was frequently inspected in the 1970s to the early 1980s, was not inspected between 1981 until 1991 or 1992.

Panel - Little, Mahoney, Shaw, April 17, 2001, 48:23- 50:13
Exhibit 56, Tab 4, Letter to Ian McLeod from Willard Page dated June 4, 1979; Tab 5, Letter to Ian McLeod from Willard Page dated November 26, 1980; Tab 20 Letter from Willard Page to D. McCallum dated September 7, 1990; Tab 21 Memo from J. Janse to Willard Page et al re: Water and Sewage Inspection Program dated May 3, 1991

590. In 1988 the Provincial Auditor released a report raising serious concerns about the MoE's lack of scheduled inspection of municipal and sewage water treatment plants and the lack of documentation on whether these plants met the health and aesthetic requirement of the ODWOs. In particular, the report raised concerns about the MoE's lack of self-initiated inspections. The report noted that the Ministry's monitoring and control procedures to ensure that water and sewage was treated in accordance with the Ministry's requirements were weak. Furthermore, MoE had incomplete information on the quality of drinking water and the water returned to lakes and rivers through the sewage treatment systems. The report recommended the Ministry conduct in-depth inspections of all water and sewage treatment plants at least annually and to supplement these inspections with periodical informal visits, particularly to plants identified as having prior problems. The Provincial Auditor also recommended MoE inspections and visits be documented and to record matters that required follow-up.

Panel - Little, Mahoney, Shaw, April 17, 2001, 51:15- 55:7

Exhibit 287-A, Volume 1, Tab 2, 1988 Provincial Auditor's Report, p.4

591. The MoE set up the Sewage and Water Inspection Program ("SWIP") in response to the concerns raised by the 1988 Provincial Auditor's report. The purpose of the SWIP program was to ensure compliance of sewage and water treatment plants with MoE's requirements. Under SWIP a first cycle of inspections was established for 1990-1992. During this cycle the MoE's focus was on encouraging municipal water treatment plants to address deficiencies by voluntary compliance.

Panel - Little, Mahoney, Shaw, April 17, 2001, 77:14-79:3

592. After SWIP was initiated the MoE for the first time prepared a standardised form for inspections and the inspection reports were sent to the municipality, the operating authority and the local medical officer of health. In the event a significant deficiency was identified, the municipality would be required to produce an action plan and voluntary compliance would be sought to address the deficiency. The MoE verified compliance in the next inspection cycle. .

Panel - Little, Mahoney, Shaw, April 17, 2001, 114:1-115:1

593. During the first two years of SWIP the MoE perceived its role as primarily serving an educational function to ensure municipal operators were familiar with the requirements for operating a municipal water works. A common deficiency noted by SWIP was the lack of compliance with the minimum sampling requirements under the ODWOs

Panel - Little, Mahoney, Shaw, April 18, 2001, 8:9-15: 14
Exhibit 286, Protocol Document for Sewage Treatment Plant Inspection, Tab 4, p.11

594. By the second set of inspection from April 1992 to March 1994, the SWIP program was considered to have matured and MoE began to consider mandatory abatement to ensure compliance with the sampling requirements. The SWIP summary report, in fact, recommends that a direction be sent out to all municipalities to ensure conformance with the minimum sampling and monitoring requirement under the ODWOs.

Panel - Little, Mahoney, Shaw, April 18, 2001, 17:13- 19:12

595. An MoE internal report evaluating the value of its inspection programme notes" It is clear from the research conducted by Peter Krahn and KPMG that site inspections are very important for measuring compliance and deterring facilities from going out of compliance. The MoE noted that the two year inspection cycle had improved the rate of compliance for water treatment plants."

Panel - Little, Mahoney, Shaw, April 18, 2001, 102:17- 105:1

596. The Provincial Auditor's 1994 recommended that the MoE should be giving priority to following up on addressing the deficiencies in those plants identified as having a significant compliance problem as opposed to relying on the two year inspection cycle to address these problems. The report also recommended that the MoE should be strengthened to include the issuance of the Director's orders.

Panel - Little, Mahoney, Shaw, April 17, 2001, 97:24- 98:10

597. In 1994, subsequent to the release of the Provincial Auditor's report, the dedicated SWIP inspection team which was set up at the regional level was disbanded and the inspections for sewage and water treatment was once again transferred to the abatement staff at the district level. However, the inspectors at the district office were no longer dedicated to just inspecting sewage and water treatment plants but was required to inspect a host of other activities. In addition, by 1994 the MoE made a determination that municipal water treatment plants would be inspected every four years.

Panel - Little, Mahoney, Shaw, April 18, 2001, 99:10- 101:10

598. In June of 1995, MoE sent a letter to all municipalities in the southwest region advising them that what the MoE expected in terms of a minimum required sampling program and advising them that the MoE was seeking voluntary conformance. The Ministry also advised these municipalities it was prepared to issue a Director's order to make these requirements mandatory.

Panel - Little, Mahoney, Shaw, April 17, 2001, 95:12- 95:4
Exhibit 283, Tab 8, Report of Municipal Water Treatment plants in non-conformance with Minimum Sampling Requirements in Ontario Drinking Water Objective, Appendix 1, and Sample Letter dated August 25, 1997 from Jim Merritt

599. The Town of Walkerton was on the list of non-complying municipalities in July of 1997. However, by October of 1997 the Town of Walkerton had been removed from the list. The Town of Walkerton, thus, was not a recipient of the MoE notices, which were issued to municipalities sometime in early 1998. The reason the Town of Walkerton was omitted from the list of non-complying municipalities was because it had indicated to the local district office that it would comply with the minimum sampling and requirements.

Panel - Little, Mahoney, Shaw, April 17, 2001, 177:15-178:25; April 18, 2001, 30:12-30:14

600. By 1997, the MoE' s indecision to proceed with mandatory abatement was viewed by even its own abatement staff as having caused the MoE to have lost ground with certain municipalities who were even further out of compliance than they had been in the previous year. By 1997 the MoE was aware that their were nine municipalities in non-compliance with the sampling requirements, and one municipality had explicitly informed MoE that it was refusing to comply with the minimum sampling requirements.

Panel - Little, Mahoney, Shaw, April 18,2001, 23:15-24:11
Exhibit 283, Letter from Phil Bye to Tim Little dated July 31, 1997

601. In early 1998 the Ministry issued notices to municipalities in non-compliance with the minimum required sampling and program advising them that it intended to issue Director's Orders. The "lion's share" of the notices were issued in the south west region, the same region which was noted in the MoE's 1992 Status Report on Air, Water and Soil as suffering from the highest level of bacterial contamination in the province and having the poorest water quality. The 1992 Status Report noted that the increase in nitrates, fecal coliforms and turbidity in Ontario have either increased or remained unchanged since the 1970s. Most of the increases were registered in sites in the Southwest and were attributable mainly to fertilizers and other agricultural sources.

May 9, 2001, Janse, Mahoney, Little, 171:11-178:2
Exhibit 325, MoE's 1992 Status Report on Air, Water and Soil

602. The notices, which were issued, however, were not a legally binding instrument and could not be enforced in the event of non-compliance. The Ministry never issued any Director's order because the municipalities, which had received the notices, assured the MoE that they would comply with the sampling and notification requirements. However, there was no evidence that the MoE promptly took steps to verify whether any of these municipalities were in fact complying with the notices. MoE witnesses testified that the procedure in place at the MoE was for inspectors to verify compliance in the next inspection cycle yet MoE witnesses had no direct knowledge whether a follow-up inspection to verify compliance had, in fact, occurred.

Panel - Little, Mahoney, Shaw, April 17, 2001, 29:16-31:21
Panel -Janse, Little, Mahoney, May 9, 2001, 178:9-180:6

603. In fact, during the entire decade that the SWIP programme operated the number of Director's order that were issued was very low and it is quite possible that none were issued. By 1995, MoE had obtained statutory authority to also issue field orders. However, it is likely the number of field order that were issued to municipal water treatment plans was also very low.

Panel - Little, Mahoney, Shaw, April 18, 2001, 32:4-33:11

604. The MoE inspections of the Walkerton PUC were always announced to the Walkerton PUC staff. The PUC staff when advised that MoE would be undertaking an inspection would ensure that the pump house was in order and that the chlorination system was operating.

F. Koebel, December 7, 2000, 153:5 - 153:11.
S. Koebel, December 18, 2001, 123:5- 123:21.

605. MoE inspectors did not follow up to ensure compliance once they had pointed out deficiencies to the Walkerton PUC. For instance, Mr. Larry Struthers testified that after the Walkerton PUC had been advised in the 1996 inspection report that it was not undertaking a sufficient number of samples. However, Mr. Struthers did not follow up by reviewing reports or otherwise to ensure that the PUC was doing the required number of samples that Mr. Stan Koebel had committed to do. Similarly, Ms. Michelle Zillinger testified that she never had any evidence which would clearly indicate that Stan Koebel was in fact addressing the issues raised in her 1998 report outside of his letter in response to her inspection report.

Struthers, October 26, 2000, 266:3-267.11
Zillinger, November 7, 2000, 10:18- 11:2

606. The issuance of the a Director's order requiring the Walkerton PUC to bring its operation into compliance by a specified date would have be forwarded to the PUC Commission and would have ensured that the Walkerton PUC responded more expeditiously to the deficiencies noted by the MoE inspectors.

S. Koebel, December 20, 2000, 208:9-208:24

607. In March of 2000, Mr. Kal Haniff, Director of the west central region and lead director of the District Manager's Committee sent a letter to all Divisional Directors requesting the MoE shift from voluntary abatement to mandatory abatement. The letter was sent in response to an internal MoE report evaluating its inspection functions. The MoE was also aware that the Provincial Auditor had been visiting a number of MoE offices and conducting interviews with MoE staff as well as Regional Directors and would be releasing his report later in that year.

Panel - Little, Mahoney, Shaw, April 17, 2001,142:12-145:4
Exhibit 266, Tab 7, Report - Ministry of Environment Operations Division, Enforcement, p.9

608. It was not until after the outbreak of E.coli at Walkerton in May 2000, the MoE undertook a dramatic shift from voluntary abatement to mandatory abatement. From June of to December 20000 the MoE undertook a blitz of inspections of municipal water treatment plants A total of six hundred and fifty nine plants were inspected and of those three hundred and sixty seven were identified as having deficiencies. The most common deficiencies identified was inadequate sampling program, inadequate disinfection procedures or practices, failure to meet the minimum treatment requirements set outs in Ontario Regulation 459/00 and improperly certified operators of facilities. The MoE issued total of three hundred and forty one field or provincial officers order specifying compliance dates. In addition, MoE inspectors verified compliance upon expiry of the compliance dates.

Panel - Little, Mahoney, Shaw, April 17, 2001, 151:25-153:24

**Recommendations:**

**The Drinking Water Protection Regulation should specific a minimum frequency of inspection for municipal water treatment plants as well as small water treatment serving the public such as trailer parks and motels. The MoE should ensure that it supplements its inspection programme with a number of unannounced inspections of municipal water works as well as small water treatment plants.**

**The MoE should ensure that all inspection reports, expert reports, application for certificates of approval and any other relevant documents relating to a municipal treatment plants or a small water treatment plant are stored in a central registry accessible to MoE staff in the District and Regional Offices and by Approvals Branch in Toronto. MoE inspectors should be required to familiarize themselves with these documents prior to undertaking inspections.**

**MoE inspectors should receive training on conducting inspections of municipal water treatment plants as needed and should be familiar with the legislative requirements pertaining to water treatment plants.**

**MoE inspectors should be required to specify target dates for any non-compliance matters and should promptly follow up promptly to ensure compliance as opposed to waiting for the next inspection cycle.**

## III.D. MOE ENFORCEMENT

609. The MoE's enforcement unit was established in 1980 and was formerly known as the Special Investigations Unit. The MoE traditionally did not take an adversarial approach to addressing non-compliance by municipal water treatment plants. The MoE was of the view that it was in everyone's interest to provide safe drinking water and there was no need for prosecution to bring

municipal water treatment plants into compliance. Furthermore, the MoE also tended to treat municipalities more favourably than private industrial operations, considering the former to be"children of the province."

Panel - McIntryre, Jackson, Gregson, March 6, 2001, 72:11-74:19; 84:11-90:1

610. By 1985 the enforcement unit in the MoE had expanded and became know what is currently know as the Investigations and Enforcement Branch ("IEB"), staffed by people with people with technical and investigative backgrounds. In conducting prosecutions the Branch works closely with the MoE's Legal Service Branch and relies on experts within the MoE in undertaking investigations.

Panel - Johnson, Weider, Robertson, April 24, 2001, 188:24- 189:3; 22:15-24:19; April 25, 2001, 27:17-28:11

611. The IEB usually becomes involved in an investigation as a result of an occurrence report generated by abatement staff. However, with respect to municipal water works it is unlikely that an occurrence report would have been forwarded to IEB. Many of the Certificates of Approvals issued to municipal water works did not include any terms or conditions pertaining to monitoring and sampling and the ODWO was only a guideline which could not be legally enforced. The Ministry identified this situation, as one of "non conformance" as opposed to non-compliance. IEB could not undertake enforcement to address situations of "non-conformance" because there was no regulation or instrument to enforce. However, in instances of " non-compliance," by municipal water treatment plant, IEB has initiated a prosecution. Since the promulgation of Ontario Regulation 459/00 the issues of "non-conformance" for municipal water treatment plants has been eliminated

Panel - Little, Mahoney, Shaw, April17, 2001, 122:17-124:3
Panel - Johnson, Weider, Robertson, April 24, 2001, 67:6:- 70:20
Exhibit 303, Tab 8, Prosecution Disposition Report dated October 16, 1998

612. Sometime after 1995 at an internal meeting, investigators were advised that there had been a "paradigm shift" in the MoE and the MoE would be considering alternatives to enforcement such as partnerships and voluntary compliance. Investigators were advised that the regulated community was to be regarded as "clients" and the MoE would now be working in partnership with them. .

Panel - Weider, Johnson, Roberston, April 25, 2001, 48:10- 49:7; 103:12-103:25

613. The MoE did not undertake any policy analysis to assess whether this "paradigm shift" would ensure greater compliance with environmental laws nor did it undertake any public consultation with Ontarians before embarking on this new approach to achieve regulatory compliance.

Panel - Weider, Johnson, Robertson, April 25, 2001,49:20-50:1

614. There was also evidence that the MoE's enforcement activities were subject to political interference from the Red Tape Commission. A letter dated March 2, 1998 from Mr. Frank Sheehan, MPP, Chairman of the Red Tape Commission to Minister Sterling regarding a prosecution of a landfill operator states:

> The ministry is continuing to purse enforcement of this matter with a vigour that might be applied elsewhere. We have difficulty imagining what environmental horror is being averted by prosecution of a company for a technical violation of an unnecessary requirement. We are sure that there are matters of greater importance to the province's environmental health, which the Ministry's Enforcement staff and courts would be better occupied pursuing.

615. Minster Sterling when questioned about Mr. Sheehan's letter agreed that it was a totally improper interference with the MoE's prosecutorial discretion.

Sterling, June 27, 2001, 75:16-77:15
Exhibit 334-C, Tab 40, Letter from Frank Sheehan to Minister Sterling, Re: Landfill Services Areas, dated March 2, 1998

616. In 1996 approximately ten of the fifty-one IEB positions were eliminated. In addition, the Investigative Support Services Section was also eliminated the following year and the two remaining members were reassigned to the Strategic and Tactical Research Unit. In 1991 this section had originally consisted of ten investigators located at head lead office to be used in event of a major environmental problem or a cross-border problem. By 1997 the number of individuals assigned to the Investigative Support Services had been reduced to four. The number of fines obtained from enforcement activities also precipitously declined after 1995 with the fines obtained for 1998 being the lowest in a decade. According to Mr. Jim Merritt, a former Assistant Deputy Minister of Operations Division, the significant decline in enforcement activity was directly correlated to the reductions in staff at the MoE.

Panel - Weider, Johnson, Robertson, April 24, 2001, 150:6- 150:11; 161:10-162:21
Merritt, April 12, 2001, 153:15- 154:12.

617. The MoE Communications Branch used issue press releases after charges were laid by MoE's investigators. After 1995, the government requested that the press releases be forwarded from Communications Branch to the Minister's office and to the Premier's office for approval. MoE investigators who had previously discussed their cases with the media were prohibited from doing so unless they first cleared the media's questions with MoE's Communication Branch. This procedure caused delay in providing the media with the results of the MoE's enforcement activities and had the effect of undermining the deterrent message from enforcement activities.

Panel - Weider, Johnson, Robertson, April 24, 2001,168:16-172:23.

618. The MoE used to disclose information about its enforcement activities, including fines and the number of prosecutions undertaken in a publication entitled "Offences against the Environment." However, after 1994 it stopped publication of this document. Mr. Tom Coleman, the Director of the MoE's communication branch also refused publication of a document commemorating the tenth anniversary of the IEB. In a letter dated November 16, 1995, to Ms. Sheila Willis, a former Assistant Deputy Minister of Operations Division, Mr. Coleman states" I have a lot of trouble publishing a self congratulatory piece of pap like this at a time of budget restraints/lay offs ...Unless there are really compelling reasons (please provide) I think this would upset the Deputy, the Minister and even the Premier."

Panel - Weider, Johnson, Robertson, April 24, 2001, 165:14-166:15;172:24 -175:22
Exhibit, 304, Tab 4, Memo from Tom Coleman,, to Sheila Willis dated November 16, 1995

619. One of the purposes of the Ministry's enforcement activity is to ensure both specific deterrence and general deterrence thereby improving compliance rate through enforcement activity. If MoE had in fact prosecuted municipalities operating water treatment plants with failing to comply with the Ministry's requirements for sampling and monitoring requirements it would have ensured specific and general deterrence. In turn, the council for the Town of Walkerton would have taken the situation of persistent non-compliance by the Walkerton PUC more seriously.

Panel - Weider, Johnson, Robertson, April 25, 2001, 1104:1-106:6
Robinson- Ramsey, December 1, 2000, 121:1-123:2

**Recommendation:**

**MoE should ensure that its enforcement approach of environmental legislation and regulations is based on the principles, of independence, timeliness, consistency, effectiveness, and transparency. Specifically,**

- **MoE should ensure that enforcement staff has appropriate resources to undertake enforcement, including access to scientific and technical expertise;**

- **MoE should ensure regular training programmes are provided to enforcement staff;**

- **MoE should set performance objectives and methods of evaluating effectiveness to ensure the effectiveness of its enforcement activities and to set priorities; and**

- **MoE should provide detailed reports to the public on its enforcement activity in order to ensure accountability in this area. These should be modelled the annual "Offences Against the Environment" reports the last of which was released in 1994.**

## III.E. CONTINGENCY PLANS AND REMEDIATION PLANS; EMERGENCY RESPONSE, CONTINGENCY PLANNING AND NOTIFICATION

### Introduction

620. A number of issues arose in the evidence with respect to the Boil Water Advisory and emergency and contingency planning once Walkerton's water became contaminated.

621. The particular importance of Boil Water Advisories is that they hold the potential to avoid or mitigate the number of residents that may become sick by ingesting contaminated water. With respect to Walkerton, there is evidence that there could have been a correlation between the early issuance of the Advisory and a correspondingly reduced number of people who become ill.

Ellis, January 11, 2001 106:13-107:16
Ex. 245, Ellis Undertaking Response p. 1

622. Similarly, emergency planning is important since such plans, once implemented, hold the potential to again reduce the number of people becoming ill through better notification as well as to be able to invoke tools and measures in order to deal with the crisis at hand.

## III.E.1 - Boil Water Advisory Notification

623. The Medical Officer of Health has the duty and authority to alert the public to unsafe drinking water conditions. The primary tool available to this official is the Boil Water Advisory (BWA). BWA is a term used in the ODWO.

Ontario Drinking Water Objectives, Section 4.1.3

624. There are three categories of reasons to issue a boil water advisory; any one of which may be the rationale. These are because the medical officer of health cannot assure the public that the public water supply is safe in any of these three circumstances. The first is inadequate disinfection. The second is unacceptable microbiological quality. The third is an epidemiological link of an outbreak to water.

D'Cunha June 28/01 176:18-177:10

625. Prior to Walkerton, and to date, there is no protocol for the issuance of a boil water advisory.

D'Cunha June 28/01 110:14-21

626. On May 21, 2000, a BWA was issued with respect to the Walkerton water works. The BWA reads as follows:

> The Bruce Grey Owen Sound Health Unit is advising residents in the town of Walkerton to boil their drinking water or use bottle water until further notice. The water should be boiled for 5 minutes prior to consumption. This recommendation is being made due to a significant increase in cases of diarrhea in this community over the past several days.
>
> Although the Walkerton PUC is not aware of any problems with their water system, this advisory is being issued by the Bruce Grey Owen Sound Health Unit as a precaution until more information is know about the illness and the status of the water supply.
>
> Anybody with bloody diarrhea should contact his or her doctor or local hospital.

Evidence of Murray McQuigge, Exhibit 185a, Tab 20

627. The BWA was lifted on December 5, 2000.

628. Three issues are relevant to the Walkerton BWA. These issues pertain to the (1) timeliness of the BWA; (2) the adequacy of notification both to the public and to institutions within Walkerton; and (3) the content of the BWA.

### III.E.2 - The Timeliness of the BWA

629. One issue is whether officials could have, and should have, issued the BWA earlier. Some of these issues were discussed above in section II.F – "Outbreak Detection." What is at issue here is whether the Boil Water Advisory should have been issued earlier than May 21, 2000 based on the information the health unit had at the time.

630. Throughout the week of May 16, 2000, the health unit was given a number of indications that water was the likely source of contamination, despite the assurances given by the PUC. Some of these indicators include:

- Dr. Hallett informed the health unit on May 18 and 19 of two cases suspecting that the problem was E. coli in the water [See discussion of this issue: II.F.2 "Chance Discovery by Owen Sound Pediatrician"]
- Dr. Gill reported 8 cases on May 18 and 19, 2000;
- Bev Middleton spoke to school officials on May 19 and was informed of a number of people with illnesses;
- The health unit was informed by Brucelea Haven on May 19 that it was not using municipal water;
- Walkerton water files were not reviewed early in this week; [See discussion of this issue: II.F.3 Health Unit Delay to Review Record]
- On May 21, until 1:00 p.m., the radio news was still assuring people that water does not appear to be the problem; [generally, see: II.F.5 "Health Unit Downplaying Water as a Source"]
- On May 21, at 1:30 p.m., a Boil Water Advisory is issued.

Patterson Dec. 11/2000 pp. 58-59; 65, 70, 83, 165

631. In hindsight, it is always easy to second guess decisions being made, especially when such decisions were made in the midst of misinformation, uncertainty and the lack of concrete information. However, the early issuance of Boil Water Advisories is an important issue that is not guided by clear provincial guidelines.

632. With respect to Walkerton, the evidence showed that a Boil Water Advisory was almost considered a "last resort." For example, the Ontario Drinking Water Objectives directed that in the case of an adverse health result from a point in the distribution system, the system needed to be re-sampled at three locations: the location of the adverse result; upstream and downstream. Action would only be taken after re-sampling showed adverse results.

Hamilton, Nov. 7, 2000, p. 197-201
Struthers, Oct. 26, 2000, p. 147-155

633. Similarly, Dr. McQuigge explicitly stated that they are reluctant to issue boil water advisories too soon.

McQuigge Jan. 9/01 218:18-19; 220:1-13

634. The approach provincially and nationally has changed since Walkerton, where now the medical officers of health do not necessarily wait 24 hours for a "confirmed" result; the bar has been raised across the country. Now, post-Walkerton, the public health community issues a Boil Water Advisory while lines are flushed, chlorine levels are raised and resampling is conducted; and lift the boil water advisory once two samples return negative.

D'Cunha June 28/01 40:10-41:25; 43:3-18

635. The reason that there are higher numbers of Boil Water Advisories now, among other things, is that when adverse results are found as outlined in the draft guideline, there is a greater awareness of a risk or potential risk.

D'Cunha June 28/01 170:21-171:3

Findings

The health unit did not take a precautionary approach, an approach that may have led to the earlier issuance of the advisory. Although the decision to issue an Advisory is a discretionary one based on the judgement of the medical officer of health. However, that judgement should be based on certain principles, such as a precautionary approach.

**Recommendations**

**Immediate and stringent re-sampling, detection of the cause of the adverse result, alterations to the treatment system, flushing water mains to distribute disinfection throughout the system, and shutting off the source/s should all be pursued in case of adverse water sample detection. Boil Water Advisories should be considered in accordance with provincial guidelines.**

**Boil Water Advisories should be guided by a more comprehensive and precautionary policy. As a general principle, Dr. McQuigge agreed that it is desirable to issue a Boil Water Advisory as soon as possible, even if it is precautionary.**

McQuigge, January 9, 2001, p. 219

636. The draft provincial Boil Water Advisory guidelines, entitled "Protocol for the issuance of a Boil Water or a Drinking Water Advisory", are a positive step in clarifying concerns pertaining to the issuance of the Advisories and should be furthered in a timely manner. This Ministry of Health and Long-Term Care document is dated the Spring of 2001. In developing these guidelines, assistance can be sought from experiences in other jurisdictions.

For example, see Presentation by Dr. G. Allen Heiman, Boil Water Advisories Exhibit 389, Tab 5
D'Cunha June 28/01 see pp 106-109; Exhibit 389, tab 7

**Adequacy of Notification - Generally**

637. Another issue that arose pertains to whether the Walkerton community received adequate notification of the BWA.

638. The evidence is clear that the radio, namely CKNX and CFOS stations, were the exclusive means of communicating the BWA.

639. The medical officer of health phoned in the BWA to two radio stations: CFOS and CKNX shortly after 1:00 p.m. on May 21. Due to minimal staff at the stations, he left a message on the radio's voice mail. The message ran at the top of each hour until 11:00pm and then again on Monday.

Gillespie, January 18, p. 25
Patterson, December 11, p. 97

640. There was no other notification except that faxes were forwarded to a local newspaper although it would not publish until Tuesday, May 23, 2000. Faxes were sent to the Sun Times, Hanover Post and Walkerton Herald Times.

McQuigge, January 8, 2001, pp. 154-5; and Exhibit 196

641. Only 44% of Walkerton residents actually heard or were otherwise notified of the BWA. Of those that heard of it, the means by which they heard it was:

- 34% by radio
- 41% by family and friends
- 7 by TV

Exhibit 156B, Tab 28 Patterson December 11, 2000, p. 106

642. Mr. Patterson was asked why radio was used to communicate the BWA. His response was:

A. A number of reasons. Firstly, we're on Sunday of a long weekend, newspapers aren't going to be of any use to us. Secondly, the past practice for us, upon occasion, we are dealing with situations like this, whether it be meningitis or whether it be a rabies case or whatever, but our past practice has been to use the radio station for that type of notice.

Patterson, December 11, 2000, p. 99

643. It is submitted that despite the efforts of the Medical Officer of Health and his staff, notification of the BWA through the exclusive medium of the radio was inadequate.

644. It should be noted that the evidence revealed that radio listenership on weekends for both AM and FM stations is less than half than during the same times during the week. During the weekend however, for the two days (Saturday and Sunday), there is a combined percentage reach of 39.1%. Exhibit 225 is called "CKNX Radio – Audience Estimate for Walkerton Area". According to this exhibit, while the combined percentage reach for the weekend is 39%, the estimated reach for Sunday alone is only 24.9%.

Gillespie, January 18, 2001, pp. 13 and 19

645. Moreover, both the AM and FM stations have very specific target audiences. The AM station target audience is the "agricultural community" and ages thirty-five and up, while for the FM station, the target audience is between 25 to 54.

Gillespie, January 18, 2001, p. 44

646. Mr. Gillespie agreed that in light of his experience in the field of radio, it is not sufficient to solely rely on a radio outlet for notification.

Gillespie, January 18, 2001, pp. 59.60

647. The lack of notification and the effects of that deficiency were very clearly identified by Ms. Diana Adams. Ms. Adams has three young children (5, 8 and 10). The family went to a cottage out of town on May 21 in the morning and returned in the late afternoon. The family did not routinely listen to CFOS or CKNX. Because they did not listen to the radio, they did not find out about the BWA until Tuesday morning. In fact, Mr. Adams used tap water as water for a soccer practice on the evening of May 22.

Diana Adams, January 16, 2001 pp. 9-15

648. With respect to the effect of notification techniques of BWA, Exhibit 157 is of interest. It is a published article entitled: "Effect of a Boil Water Notice on Behaviour in the Management of a Water Contamination Incident" by M. O'Donnell, C. Platt and R. Aston [*Comm. Dis Public Health* 2000:3:56-59]. Under its study of case examples, it found that in one case 85% of the residents found out about a BWA through receiving a leaflet.[p. 57] The study noted that, even with a leaflet outlining in some details what to do and not to do, at least 62% of those who received and read the boil water notice put their health at risk by using unboiled water.[p. 57] The article then discussed residents' suggestions for enhanced notification, such as actual notice by someone knocking on the door, particularly for those that are elderly or otherwise vulnerable.

649. In retrospect, Dr. McQuigge acknowledged that if he had to do it over again, he would have informed the TV stations and distributed handbills. Mr. Patterson would also use TV if he had to do it over again.

McQuigge, January 8, 2001, pp. 157, 160
Patterson, December 11, 2000, p. 99

Findings

It is submitted that the Commission should make a finding that even in small communities, notification of a BWA exclusively through radio is inadequate. There were many options available to broaden the reach of the notification, including:

- Notifying other radio stations such as the CBC;
- Notifying TV stations;
- Distribution of handbills to each resident of the community;
- Notification by way of mobile loudspeakers; and
- Posting signage of the BWA at the highway entrances to the community.

**Recommendations:**

**Every community should have in place a means to ensure that residents can be notified of emergencies such as BWAs. Notification should include notification to radio stations, TV, print media, and where possible the use of handbills, loudspeakers and signage in certain areas.**

**Provincial boil water guidelines, such as the draft "Protocol for the Issuance of a Boil Water or a Drinking Water Advisory" should be developed to ensure that such measures are standardized.**

### III.E.3 - Urgency

650. The lack of urgency regarding the broadcasting of the BWA is important. According to Exhibit 225, the news broadcast at 1:00 a.m. noted that "as for the cause, McQuigge doesn't think it can be blamed on flooding because Walkerton's water comes from a deep well and the incubation period would take the contamination before Friday's heavy rains."

651. The next broadcast at 2:00 p.m. was the announcement of the issuance of the Boil Water Advisory, without its full text. To be fair to Dr. McQuigge, the interview with respect to the 1:00 p.m. broadcast was held in the morning. However, what is important here is simply the confusion this may have caused the public.

> Q. …"And do you think it would have been important to include that the water should have been boiled for five (5) minutes prior to consumption? Would that be something that in your experience, would have added value to that newscast?
>
> A. We, in retrospect, yes, probably.
>
> Gillespie, January 18, 2001, p. 50
>
> Q. The very last line of the Boil Water Advisory says that:
>
> Anybody with bloody diarrhea should contact his or her doctor or local hospital."
>
> I notice that's not in the –in—in the news bulletin. Do you think that in light of your experience, that would have been useful to include in the news bulletin?
>
> A. Yeah, I think it would have, in retrospect.
>
> Gillespie, January 18, 2001, p. 52

652. Mr. Gillespie did say that it was more difficult on weekends than during the week, but it would be possible to interrupt programming for special bulletins. Mr. Gillespie agreed it may have preferable to run the BWA every 30 minutes as compared to every hour.

> Gillespie, January 18, 2001, p. 53

653. It is submitted that the BWA did not have the urgency it required. Exhibit 272 outlines the interview between Dr. McQuigge and CKNX radio. It is not possible to determine with any sense of confidence the manner and tone of

how the Boil Water Advisory was relayed. However, there does appear to be an absence of any express protocol or procedure as to how to issue the BWA.

654. Mr. Gillespie did not know the level of urgency that was relayed by Dr. McQuigge. However, if Dr. McQuigge had suggested that the BWA was urgent and that it be broadcast every 15 minutes, Mr. Gillespie suggested that the request would have been followed.

Gillespie, January 18, 2001, p. 55

Findings

There was a communication issue where the BWA was forwarded to the media without clear direction as to the urgency of the message.

**Recommendations**

**Further to the previous recommendation, in developing protocols for BWA, there needs to be a process whereby the BWA can be communicated with sufficient urgency and direction. The media should be made aware of the BWA protocols or guidelines through awareness and education programs.**

### III.E.4 - Notification - Institutional

655. Daniel Smith, superintendent of the Walkerton Jail, testified that he was informed by his staff that there was a problem with the water on the morning of Monday, May 22. He was also informed that one inmate had displayed flu-like symptoms. His staff had heard that there may have been a problem with the water.

Smith, January 17, 2001, p. 36

656. It was not until later in the day that the Jail found out about the BWA and as such, it was not boiling water until the afternoon of May 22, 2001.

Smith, January 17, 2001, p. 39

657. The Jail was not advised of the BWA by the Health Unit, the Town or the MoE. It was Mr. Smith that contacted the health unit on May 23, 2000 in order to be updated and receive instructions.

Smith, January 17, 2001, pp. 41-45

658. With respect to an internal investigation, it was found that three different employees on separate occasions advised the operational manager of the Jail

of the BWA on May 22, 2000. However, he did not act on this information. The report noted that:

659. The investigation has concluded that the information given to the manager on May 21, 2000, was correct and of a serious nature. This information was not taken seriously by the manager, nor did he act upon it.

Exhibit 220; Smith, January 17, 2001, p. 57

660. Apparently, he would have acted if there had been official notification.

Smith, January 17, 2001, pp. 49-50

661. The Jail has instituted a contingency plan for future similar outbreaks. Furthermore, all provincial jails have been advised to contact their local health unit to ensure they are on the contact list for that health unit. Also it was recognized that the Jail was not on the contact list for the Brockton Emergency Plan and that it should be.

Smith, January 17, 2001, pp. 51-2

662. Brucelea Haven, a nursing home, refrained from using municipal water on May 19 and issued their own internal advisory at that time and were not informed of the BWA until notified on May 23. This action was taken since there were a number of sick residents, and there were reports of 25 sick children at local schools.

Donald Moore, January 16, pp. 35-36

663. Officials at Brucelea Haven heard about Boil Water Advisory on Sunday May 21 through the media. According to Mr. Moore, their offices were closed on Sunday and Monday and as such, no notification occurred. It appears that the institution contacted the health unit on Tuesday, May 23. At an earlier contact with the health unit, the unit assured the institution that the water was safe.

Donald Moore, January 16, pp. 37-40

664. Mr. Moore agreed it would be prudent to have institutions such as nursing homes as a target for notification should such issues arise again.

Donald Moore, January 16, p. 59

665. Joanne Todd, an employee with Maple Court Retirement Residence, testified that she advised Bev Middleton of the health unit that three residents took ill with diarrhea on the afternoon of May 19, 2000. She also contacted the PUC

who stated that the water was fine. Official notification of the BWA was not made until May 23, 2000 by way of a telephone call from the health unit.

Findings

It is submitted that the Commission should find that certain institutions in Walkerton (nursing homes, jail) were not notified. The lack of notification could have contributed to more illnesses and deaths but for the precautionary approaches taken by places such as Brucelea Haven.

**Recommendations**

**It is recommended in the notification procedures recommended above, institutions should be given a special status in that they should be directly notified and notified in a timely manner.**

**Further, each institution should have their own contingency plans in place for events such as the contamination of water.**

## III.E.5 - Content of the Boiled Water Advisory

666. Exhibit 224 are the "Cuts" from the Walkerton Boiled Water Advisories that were aired on CKNX FM 102 and Country 920 CKNX on Sunday, May 21, 2000. It is clear that some newscasts did not relay all aspects of the BWA. In fact, none of the broadcasts actually read the Boiled Water Advisory verbatim. Only certain portions were read. It is argued that unless the public knew the procedure and process with respect to a BWA, they might not understand and comprehend the implications of the advisory and the full extent of the safeguards that should be undertaken.

667. Exhibit 157, an article entitled: "Effect of a Boil Water Notice on Behaviour in the Management of a Water Contamination Incident" outlines the content of a boil water advisory in its case study. While a detailed comparison between the notice in this study and the Walkerton advisory is not necessary, it is apparent that the notice in the study is more detailed, dealing with what uses tap water can and cannot be used for and the effect of contaminated water on pets.

Findings

The BWA issued on May 21, 2000 in Walkerton should have contained more detailed information with respect to measures to take to protect human health.

**Recommendations**

**Boil Water Advisories should be clear and comprehensive and contain the essential information necessary for public protection.**

## III.E.6 - Role of Municipalities in Issuing Boil Water Advisories

668. According Dr. McQuigge, he informed Mayor David Thomson at noon on May 21 that he would be issuing a BWA.

McQuigge, January 8, 2001, pp. 156

669. It is apparent that the Mayor David Thomson did not take any steps to either elaborate on the BWA or take other steps to notify the public.

Q. What about the need to identify and notify people who may be particularly at risk, or who may be especially vulnerable. People like seniors, people of immuno-suppressed systems, people undergoing chemotheraphy. What steps, if any, did the Town take to identify and notify these people?

A. I do not recall.

670. Further he stated:

Q. No discussion of the need to get out a special edition of the newspaper?

A. I don't recall.

Q. No discussion of the possibility of buying radio and T.V. spots to get the word out?

A. No, I believe we left that up to Dr. McQuigge. I felt that Dr. McQuigge was looking after the advisor and the notification.

Q. And you saw no need to supplement that information being provided by Dr. McQuigge?

A. I – I don't recall whether we did anything in those regards or not, I – as I said there was so many things going on, I find it difficult to remember everything.

Thomson, November 30, 2001, p. 77

Findings

The municipality did not sufficiently assist the health unit in ensuring that the BWA was communicated.

**Recommendations**

**Municipalities like Brockton should ensure that it has an Emergency Plan that could be activated in water contamination situations. This should include provisions for broad and effective communication measures to assist the Medical Officer of Health in the notification of Boil Water Advisories.**

## III.E.7- Availability of Alternative Drinking Water Supplies

671. It is submitted that the municipality had an obligation to ensure that there was an adequate and sufficient supply of alternative drinking water supplies once the BWA was issued. This alternative source of water should be accessible to all residents.

672. It appears that the municipality of Brockton did not fully discharge this function since there were delays in ensure both sufficiency of supply and access to that supply.

Thomson pp. 80-81 and p. 90

**Recommendation**

**Municipalities, in their emergency or contingency plans, should include measures to ensure that alternative drinking water supplies are sufficient. Provisions should also be included that would ensure those supplies are accessible.**

## III.E.8 – Declaration of a State of Emergency

673. In May of 2000 during the midst of the tragedy, a state of emergency was not called by either the Mayor of Brockton or the premier of the province.

674. In 1999, the Municipality of Brockton adopted an emergency planning by-law [By-Law #99-91]. This by-law gave authority for the municipality to develop and adopt an emergency plan which was adopted. The authority to enact such a by-law is given through the *Emergency Plans Act* [R.S.O. 1990, chapter E.9] The Brockton Emergency Plan was introduced into evidence as Exhibit 119.

675. It is clear that the Walkerton tragedy clearly falls within the definition of an emergency and there would have been significant benefit should this plan have been invoked.

676. An emergency is defined very broadly to include “situations, or in the threat of impending situations abnormally affecting property and the health, safety

and welfare of the community, which by their nature or magnitude require a controlled and co-ordinated response by all agencies."

Exhibit 119, section 1.1

677. A stated aim of the plan, inter alia, is to provide essential services for victims and prompt factual information to all officials, media and members of the public.

Exhibit 119, section 2.1

678. The Plan then establishes a Municipal Control Group and primary operations centre. It then outlines specific duties for various institutions within the system, including the PUC and the medical officer of health. In addition, the plan outlines appropriate network and contact procedures and there are extensive appendices outlining contact information.

679. Section 5.1 of the Brockton plan gives the authority to the mayor to declare an emergency. The *Emergency Plans Act* [R.S.O. 1990, chapter E.9] also describes the powers of the mayor to declare an emergency. Section 4 of the *Emergency Plans Act* states as follows:

> s. 4(1) The head of a council of a municipality may declare that an emergency exists in the municipality or in any part thereof and may take such action and make such orders as he or she considers necessary and are not contrary to law to implement the emergency plan of the municipality an to protect property and the health, safety and welfare of the inhabitants of the emergency area.

680. Section 7 of the Act gives similar powers to the Premier of Ontario.

681. It is submitted that the Brockton Emergency Plan should have been invoked as early as when the Boil Water Advisory was issued on May 21, 2000.

682. On May 23, 2000, Brockton Council met, and contemplated whether to call a state of emergency.

> Q. Well, then if I can summarize your evidence on this point, sir, on May 23rd and on the 24th, despite the fatalities, despite the illness, despite the hardship that our constituents were going through, despite the contaminated state of the water system; you and Council didn't feel this was an emergency situation?
>
> A. Not to declare an emergency. We were dealing with all of the issues within the emergency that we could deal with.

Q. And so in your view, notwithstanding, all of those factors, this was not sufficiently serious enough to declare an emergency?

A. In our opinion, no, or we would have?

Q. Well, I guess I have to ask you this, what is the threshold for declaring an emergency in circumstances like this? How many more fatalities, how much more illness, would it have taken for you and Council to declare an emergency?

A. In declaring an emergency, in this situation, we didn't realize any benefits that would come out of declaring emergency. We felt that everything was being looked after, in all areas.

We were dealing with the Ministry of the Environment, we were dealing with the health unit, we were dealing with all of these issues and they were health related issues. And it was a case of having to clear the water systems, and I guess that was – we just felt that everything was being looked after.

Thomson, November 20, 2000, pp. 89-90

683. The evidence shows that the person who had the authority to issue the BWA, Dr. Murray McQuigge, formed the view that a state of emergency would have been useful. He stated:

> If the Brockton Emergency Plan would have been invoked, "that would have been a big help to me in getting the message out."
>
> Murray McQuigge, January 8, 2001, p.159

684. There is evidence, described above, that notification of the BWA was inadequate and the medical officer of health admitted that an emergency would have been helpful in this regard. Further, there is no reason why such an emergency ought not to have been declared.

Findings

A state of emergency should have been declared by the municipality of Brockton.

### III.E.9 PUC Contingency Plans

685. While the above paragraphs refer to the emergency plans of Brockton, a related issue concerns the contingency plans of the Public Utilities Commission. These plans relate to the kinds of emergency procedures that

would be in place by the PUC should there be a problem with respect to the services they deliver.

686. The MOE Chlorination Bulletin requires municipalities and PUCs to have a contingency plan.

Chlorination of Potable Water Supplies Bulletin 65-W-4 s.4.0

687. Walkerton PUC did not have a contingency plan in place, or if it did, the PUC secretary was not aware of it and was not ever able to locate it.

Hallahan Vol. 19, 138:2-11 15/11/00

688. Contingency planning is an essential procedure of a PUC. The representative from the Collingwood PUC identified the need for a plan and then described the plan that the Commission had developed.

Houghton, November 28 2000, precautionary principle. 96-97

689. In the mid-1990s, B.M. Ross Engineering provided a quote to undertake a contingency plan for the Walkerton PUC. There is no evidence that this matter was furthered.

Exhibit 118

690. With respect to the Walkerton PUC, a 1998 inspection report undertaken by the Ministry of the Environment identified the lack of a contingency plan as a deficiency. Moreover, the PUC, through its manager Stan Koebel, had committed to developing such a plan.

691. The fact that there was no contingency plan at the PUC suggests that all such procedures were dependent upon the municipal emergency plan, if invoked. If the municipal plan was not invoked, as in the Walkerton tragedy, then all emergency procedures would be undertaken in an ad hoc and discretionary manner.

Finding

The Commission should find that the Walkerton PUC lacked a contingency plan. Although there is no direct evidence, the Commission can, and should, conclude that the presence of such a plan could have decreased the confusion with respect to roles and responsibilities, increased the attention to the issue at the earlier stages of the tragedy, and assisted in notification and communications, among other such tasks.

**Recommendation**

**PUCs should be required to develop and maintain a contingency or emergency plan. Not only must contingency plans in accordance with the Chlorination Bulletin be made mandatory, but they must be confirmed by PUC commissioners and the MOE inspectors that the plan is in place. A zero-tolerance approach with respect to the failure to have a plan must be adopted by the MoE (see the enforcement section below). Water works and local municipal staff, as well as local health unit staff must be trained as to the content of the contingency plan, its implementation, and a copy of the plan must be stored in a minimum of appropriate locations in the municipality.**

## PART IV. OVER-ARCHING FINDINGS AND RECOMMENDATIONS BY TOPIC

## IV.A. INTER-AGENCY COMMUNICATION AND DATA-SHARING

692. A significant issue leading to the tragedy at Walkerton was the lack of inter-agency communication and data-sharing in several respects, pertaining to the drinking water supply system. This issue is systematic in that there were no protocols, policies or procedures to ensure such communication and data-sharing. The August 2000 drinking water regulation goes part of the way to address this issue.

693. For example, GAP laboratories and other agencies did not keep or have access to a chart or database with all prior sample results after 1996 when the provincial routine lab functions were divested. Such a data base would be extremely useful in making judgments about the problems behind adverse sample results. Mr. Struthers agreed that having all of the results had been useful in performing his functions as an abatement officer and determining what the issues were in a system.

Palmateer Vol. 4, 150: 10-13
Brodsky May 8/01 76:7-22
Struthers Oct. 26/01 260:14-261:11

**Recommendation: A readily accessible data base of all lab sample results for a water works should be maintained by the laboratory and / or works operator, and accessible by MoE, health unit, labs, operator and general public, for a period of a rolling 10 years at a time.**

694. This section of CWC's submission addresses inter-agency communication as between various of the agencies that play a role in ensuring safe drinking water. The goal is to eliminate gaps in the overall system; ensure there is sufficient redundancy and "fail-safe" measures to avoid a single failure going un-noticed or causing a tragedy, and to clarify the roles and responsibilities of each agency.

### IV.A.1 Communication between the PUC and the local medical officer of health / health unit

695. The Walkerton PUC never forwarded results of water testing to the local medical officer of health; nor is there any evidence that the PUC staff ever initiated telephone calls or other inquiries of the local medical officer of health or health unit staff on health related matters pertaining to the drinking water system. There is no evidence that the PUC staff considered the health unit staff to be integral to the safety of the drinking water system. There were no regular meetings or communications between these agencies; the communications appear to have been originated by health unit staff, and only in response to adverse drinking water lab samples. The PUC staff seemed to take a very passive role with respect to health issues in the drinking water system – they would be telephoned by others when and if there was a problem; if they were not telephoned, they did not initiate communication. As for preventive, advance communication, rather than reactive communication initiated by health unit staff when an adverse result came to their attention, there is no evidence of such communication, whether initiated by health unit staff or by PUC. The health unit staff did not do training of local PUC staff nor did they appear to include PUC staff in their educational mailings and bulletins. The local health unit did not act as a conduit for new and emerging pathogen information; nor for new and emerging water treatment issues to local PUC's. However, prior to 1996, with the Ministry of Health lab at Palmerston doing the Walkerton PUC sampling, the local health unit received all water system results, positive or negative, and kept a manual data base of them. This assisted them in interpreting the context of adverse results, including judging drinking water to be "unsafe" under the Ontario Drinking Water Objectives guidelines.

Middleton Feb. 26/01 85:15-86:8

**Recommendations:**

**In addition to the adverse result reporting that the August 2000 standard requires, all results should be reported on a data base accessible to the PUC, the health unit, the MoE and the public. The PUC, the health unit and the MoE should have defined specific responsibilities to review the data base at regular intervals; not only when adverse results are reported, to evaluate the condition of the system and to note early warning signs of risks. The data base should include turbidity results and chlorine residuals as well as the coliform and E. coli lab samples to assist with such evaluation.**

**Regular communication between PUC staff and health unit staff should be established, with specific agenda items, including discussion of the monitoring results shown on the data base, discussion of new and emerging drinking water health risks and treatment options, discussions of particular concerns such as the**

**infrastructure system condition and equipment robustness, review of contingency response plans in case of early indications of deteriorating water or surface water influence, and periodic review of emergency response plans, among other items. The availability of health unit staff as a resource to PUC staff for health issues should be reinforced.**

McQuigge Jan. 9/01 207:12-20

### IV.A.2 Communication between the PUC and the Ministry of the Environment

696. Again, the evidence shows that in Walkerton, communications between the PUC and Ministry of the Environment were rarely initiated by PUC staff. The only exceptions appear to be when PUC staff corresponded with the Ministry of the Environment to respond to items noted in the inspection reports as deficient, and in that context to seek clarification about an item (e.g. regarding emergency plan notification requirements). The PUC staff did not have a history of initiating contact with the MoE when they received adverse lab results; nor when they had an operational problem. For example, the PUC staff did not contact the MoE (nor the health unit) when the chlorinator at well #7 broke down. When adverse results from the new main construction at Highway 9 were received, and showed "puzzling" results in terms of extremely high E. coli levels, the PUC staff proceeded with flushing but did not contact the MoE (nor health unit staff) to discuss the issues even on a technical basis. Rather the history was of MoE receiving adverse results (when the lab was Ministry of Health or GAP), and then, usually, MoE staff initiating a call to PUC staff. The instructions generally were to do re-sampling and/or flushing. Again, PUC staff did not appear to regard MoE staff as a resource to assist in providing a safe water supply to the community.

697. In addition, Walkerton PUC staff did not forward adverse results to MoE staff, despite the 1995 letter from the Owen Sound office.

**Recommendation: Systematic and regular communication between water works operators and MoE abatement staff must be established. Water works operators must be trained to regard MoE staff as a resource.**

### IV.A.3 - Communication between the Ministry of the Environment and the medical officer of health / health unit staff regarding communal drinking water systems in their locale

698. The provincial ministry of health lab at Palmerston, when it existed and did Walkerton's testing, communicated results to the PUC, the health unit and the MoE. Therefore at that time (until 1996), all three agencies at least had the same information base. However, even then, there is no evidence that there was regular or routine preventive communication between the local health unit

staff and the local MoE staff regarding the state of communal water supply safety. There is evidence that when there was an adverse result, there was sometimes communication between the abatement officer and the health unit staff, usually initiated by the MoE officer. On at least one occasion in 1995, the communication referenced the possibility of a boil water order for Walkerton.

699. After 1996, until May 2000, the health unit received no written results whatsoever from the MoE, adverse or non-adverse. Prior to May 2000, Mr. Schmidt of the health unit did receive some notification by telephone; even on those occasions, Mr. Struthers testified that he believed he only had to relay adverse results from the distribution system to the health unit; not from the "treated" samples. He held this view even though the definition of "unsafe water" in the Ontario Drinking Water Objectives applied to both treated and distribution system samples.

Struthers, Oct. 26/00 255:8-256:4

**Recommendations:**

**Again, regular communication between local MoE staff and local health unit staff, with systematic agendas directed at review and assurance of safe drinking water systems in the communities under their jurisdiction must be established. Furthermore, problems that appear at the local level that may be province wide should be communicated forthwith to the provincial levels of the Public Health Branch and the Ministry of the Environment by the local agencies. (For example, such communication could have occurred when Mr. Gray in Barrie received a letter of concern about non-notification from private labs from the Simcoe County health unit.)**

**Clarification of roles and responsibilities in a legal framework, such as a Safe Drinking Water Act would greatly enhance the understanding of the need for inter-agency communication and the types of information that must be exchanged.**

### IV.A.4 - Communication between provincial public health branch officials and water works utilities.

**Recommendation: The Public Health Branch has not historically targeted water works operators for education or information dissemination. For example, regarding the cryptosporidiosis / giardia Boil Water Advisory guidelines, Dr D'Cunha agreed that public health information regarding water should be disseminated to operators and MoE abatement staff "by somebody". For health based information in particular, he later agreed that the public health branch would (or should) be the lead. This has not happened historically, but this role should be assumed by this branch of the Ministry of the environment.**

D'Cunha June 28/01 174:7-175:17

### IV.A.5 - Communication between provincial level Ministry of Environment, Ministry of Health, Provincial Medical Officer of Health, Superbuild officials, Ministry of Finance and Ministry of Municipal Affairs and Housing

700. Communication among these agencies is essential in two main areas. One is that of on-going evaluation of health and environmental risks in the drinking water system and the robustness of the system to deal with them. This includes issues of existing standards and their health-protectiveness, treatment approaches and their sufficiency, as well as new and emerging risks and issues. The other area is that of the financing of the system, its ongoing sustainability, and the state of the infrastructure. The latter issues (financial) cannot be segregated from the former (health and environmental risk evaluation) and they must be considered together. Dr. Hukowich testified that he had seen little such communication between provincial levels of public health and environment, and even had done a search of the statutory responsibilities that encompassed both agencies, finding very few examples.

Hukowich July 4/01 157:20-158:17

701. An example of an opportunity to communicate between ministries was that of the federal-provincial sub-committee on drinking water's draft boil water advisory guidelines, which Mr. Jenkins could not recall circulating to the Public Health Branch of the Ministry of Health or to local medical officers of health in Ontario.

Jenkins May 10/01 172:3-173:6

702. Another example of problematic communication among ministries dealing with drinking water issues is that at the time of the lab privatization decision, the Public Health Branch of the Ministry of Health did not perceive its role to include evaluation of the public health risks from the decision; nor from the manner of implementing the decision. This was because "the lead ministry was the Ministry of the Environment and they had the legislative authority." This attitude demonstrates the fracturing of responsibility over drinking water and the failure to utilize the Ministry of Health expertise in public health in making drinking water decisions.

Demshar May 8/01 15:10-19

703. Furthermore, with respect to the lab privatization decision, the Public Health Branch perceived no real choice as to whether to discontinue the Ministry of Health's municipal routine water testing. This was because the "Ministry of the Environment was the lead agency" and because it was a "very senior level" decision, already made. Public Health Branch and the Ministry of

Health labs branch both felt that they had no opportunity to influence the decision.

Demshar & Brodsky May 8/01 68:7-70:10
LeBer May 8/01 289:21-290:4
Schabas June 25/01 33:11-34:5

704. Dr. Schabas stated that the public health branch assumed that the lab privatization decision had been made by the Premier's office, as "that's where in fact most policy decisions seemed to come from."

Schabas June 25/01 81:1

705. Another example of a failure to communicate at this level is that during his tenure as chief medical officer of health, prior to May 2000, Dr. D'Cunha was unaware that some private labs were not reporting to the Ministry of the Environment, even though the notification issue had been the subject of a letter from the Minister of Health to the Minister of Environment prior to his appointment. Clearly the communication within his branch did not include briefing him on this issue.

D'Cunha June 28th/01 99:17-25

706. Similarly, the issue of private labs for drinking water sampling not being accredited was never brought to the current Chief Medical Officer of Health's attention prior to the Walkerton outbreak.

D'Cunha June 28th/01 127:14-24

707. The prior structure (pre-1993) within the Ministry of Environment was preferable, according to staff who worked there at the time, when all of the professionals dealing with drinking water worked together in a drinking water section. Thereafter, when these professionals were distributed among other sections and branches, their work became more difficult in terms of coordinating and communicating.

Lachmaniuk; Jenkins May 10/01 30:6-31:16

**Recommendation: The provincial level responsibilities for drinking water in public health and in environment, among others, should be coordinated by way of establishment of a single entity or person responsible within the government for drinking water. For example, a Drinking Water Commission within the Ministry of the Environment, reporting directly to the Minister has been recommended by CWC and CELA in the paper done for Part II of this Inquiry, *Tragedy on Tap: The Need for A Safe Drinking Water Act.***

## IV.A.6 - Communication between laboratories and public health officials

708. Dr. Schabas described the advantages of communication between the public labs and those working in public health, including that the public labs would often take it upon themselves to do further tests and to communicate with public health officials, including prompting investigations. Similarly, Dr. McQuigge testified, when asked whether there is any difference between whether a private lab was doing the testing, or whether a Ministry of Health lab was doing it, that "…All I can tell you and that's based on my own personal experience is that we had a very close working relationship with our Public Health lab on lots of fronts, not just onwater, but infectious deseases in general; I preferred that situation and I still prefer it today."

Schabas June 28/01 39:4-40:1
McQuigge Jan. 9/01 97:13-22

709. This team approach did not exist with private labs. For example, not only did Dr. Schabas describe this as an inherent difference between a public labs system and utilization of public labs, but this difference was reinforced by the testimony of Mr. Deakin at A&L labs, and the testimony of Mr. Calow at Lakefield Research Laboratory. Both of these witnesses testified to the view held by their organizations that client confidentiality came first for either all (A&L) or some (Lakefield) of the time between the lab privatization decision in 1996 and the Walkerton tragedy. Similarly, Mr. Wilson of CAEL was unable to confirm that the exception in the CAEL code of ethics for the public interest would cause a member laboratory to consider the ODWO reporting provisions to over-ride the confidentiality provisions also contained in that code of ethics.

**Recommendation: The labs serving particular water works should be included in regular communications between the water works, health unit and ministry of environment staff so that in conducting the microbiological sampling for a particular water works, they are aware of historical and current issues and trends and can initiate responses or even initiate investigations based on their microbiological expertise.**

## IV.B. COMMUNICATION WITH THE PUBLIC AND PUBLIC'S RIGHT TO KNOW

### IV.B.1 General

**EBR**

710. The promulgation of the *Environmental Bill of Rights, 1993* ("EBR") ensured that Ontarians were guaranteed greater public participation in the environmental decision making process. The preamble to the EBR provides

that the government of Ontario has the primary responsibility for protecting, conserving and restoring the natural environment, but that the people of Ontario should have the means to ensure that this is achieve in an effective, timely, open and fair manner. Some of the basic elements of the EBR are as follows:

711. The EBR establishes a regime that provides that at a minimum proposals that are environmentally significant be posted on an electronic Environmental Registry for thirty days in order to provide the public with an opportunity to comment;

712. The EBR enhances the public's right to seek leave to appeal certain Ministry decisions to administrative tribunals;

713. The EBR provides a mechanism for residents to request the government to investigate the alleged violations of environmental law; and

714. The EBR seeks accountability of government by requiring among other things Ministries develop and implement "statements of environmental values" that explain how the purposes of the EBR will be applied.

Dicerni, May 14, 2001, 95:17-95:24
Schwartzel, May 18, 2001,16:11-22:17

715. One of the first major legislative initiatives introduced by the current government was the *Savings and Restructuring Act*, 1995, known commonly as Bill 26, which came into effect on November 29, 1995. Bill 26 exempted the Ministry of Finance from the requirements of the EBR and temporarily suspended the public notice requirements of environmental proposals which related to the government's cost cutting measures.

Schwartzel, May 18, 2001, 29:13-32:1
Exhibit 335-A, Volume 1, Tab 3, Ontario Regulation 482/95 and the Environmental Bill of Rights: A Special Report to the Legislative Assembly of Ontario, submitted by Eva Ligeti on January 17, 1996.

716. The first special report submitted by the Environmental Commissioner of Ontario dated January 17, 1996 to the Legislative Assembly of Ontario dealt exclusively with Bill 26. The Environmental Commissioner was critical of the government's decision to exempt the Ministry of Finance from the EBR as this meant the Ministry would no longer have to abide by its statement of environmental values. The Environmental Commissioner also expressed concern that the ten-month exemption of the public notice under the EBR was not in compliance with the "spirit of the EBR".

Schwartzel, May 18,2001 39:13-31:3.
Exhibit 335-A, Volume 1, Tab 3, Ontario Regulation 482/95 and the Environmental Bill of Rights: A Special Report to the Legislative Assembly of Ontario, submitted by Eva Ligeti on January 17, 1996.

717. The Environmental Commissioner's 1996 annual report was extremely critical of the MoE's decision not to post its decision to devolve drinking water testing to private labs on the EBR. The Environmental Commissioner states at page 20 of her report:

> This decision was not posted on the Environmental Registry for public comment by [the Ministry of the Environment and the Ministry of Health.]… The public was not consulted. Nor were municipalities. Municipalities had barely eight weeks to find private labs. And while the Ministry of Health recommended municipalities choose certified or accredited labs -- the law does not say they have to. It appears that the Ministry of Environment and Energy did not make this a legal requirement because of costs and because such a requirement runs counter to the government's move to cut regulations. ... The Ministry of Environment did no independent review of the cost of private sector testing. Many tests will cost more now -- some say five times as much as doing them at the ministry labs in some cases. Worse still, the Ministry of Environment and Energy did not check if drinking water testing is now being done properly. .... This decision most likely increases the risk of inadequate drinking water testing in Ontario. When it comes to inspecting and testing the quality of our drinking water to ensure public health and safety, and environmental protection, the Ministry must take every precaution.
>
> Schwartzel, May 18, 2001, 56:5-58:10
> Exhibit 274, Volume 2, Tab 5, Annual Report 1996, Keep the Doors Open to Better Environmental Decision Making, by the Environmental Commissioner of Ontario, page 20.

**b) State of the Environment Reports**

718. The MoE had until 1994 published state of the environment repots which provided a comprehensive overview of the state of environmental conditions in Ontario. The state of the environment report informed MoE staff, senior management and Ontarians of the success government had achieved in protecting the environment as well as the present and emerging environmental risks to the province. In preparing these reports, the MoE was following the lead of other jurisdictions, notably the federal government, which also prepared similar reports. Mr. Richard Dicerni, the former Deputy Minister at MoE, testified that state of the environment reports are important to the government 's planning process. Mr. Dicerni recommended that the state of

the environment reporting be transferred to an independent and impartial third party and agreed that the function could be undertaken by the Environmental Commissioner of Ontario.

Dicerni, May 14, 2001,23:18-26:2.
Stevens, May 29, 2001, 83:13-88:6

**c) Business Plans**

719. The MoE stopped releasing state of the environment reports because Minister Sterling was of the view that it was not a useful expenditure of government resources. Instead, the MoE started publishing business plans, which outlined the areas for environmental protection that were a priority for the MoE and established performance objectives on how it would achieve environmental protection. The business plans were posted on the EBR Registry and the MoE Internet site because the government intended to get feedback from the public regarding these plans. According to Ms. Linda Stevens, the former Deputy Minister, the government business plans were a means of the ensuring government accountability to the public. Ms. Stevens acknowledged that when the government is seeking input from the public, it should ensure that the public is provided with accurate and comprehensive information about the state of Ontario's environment. Ms. Stevens also agreed that Ontarians should be entitled to know if the government is pursuing an economic policy that is likely to increase health and environmental risks.

Winfield, May 28, 2001, 28:12-28:16
Stevens, May 29, 2001, 88:7-90:3; 97:19-98:11

720. The MoE also produced a confidential business plan which was sent to Cabinet. The confidential version of the business plan contained information about the increased environmental and health risks that were anticipated from the budget cuts. However, the government never provided the public with access to information about the anticipated adverse impacts outlined in the confidential business plan. Ms. Stevens assumed this information would have been subsequently disclosed to the public through other documents posted on the EBR registry. However, Ms. Stevens was unable to refer to a single document MoE had released to the public regarding the increased risks to the environment and human health which had been outlined in confidential business plan.

Stevens, May 29, 2001, 101: 23- 103:22.
Exhibit 330E, Tab 1, Ministry of Environment and Energy Business Plan (January 22, 1996 - Confidential)

721. On November 22, 1996 the Minister of the Environment, Mr. Norm Sterling, made public statements that the Ontario government was firmly committed to

maintaining and wherever possible, improving upon, the high standard of environmental protection enjoyed by Ontarians. The Minister and the Premier had both stated that when it came to a choice between the environment and the economy, the environment must be protected. These statements were entirely at odds with the information that had been provided to Cabinet eleven months earlier in the confidential business plan.

Stevens, May 29, 2001, 108:18-110:24.
Exhibit 330-E, Volume 5, Tab 19, Linda Stevens' notes of Director meeting.

**d) Enforcement Records**

722. The MoE also had until 1994 published its enforcement record in a document entitled "Offences against the Environment." When the government stopped publishing its enforcement records, information about enforcement records had to be obtained pursuant to requests under the *Freedom of Information and Protection to Privacy Act* ("FOI"). Documents obtained under the FOI legislation revealed that from 1995 to 1999 there was a precipitous decline in the fines for environmental offences with the 1998 figure being the lowest in over a decade.

Winfield, May 28, 2001, 17:5-27:20;71:6-73:17.
Exhibit 340-C, Tab 2, Ontario's Environment and the Common Sense Revolution, A fourth year report, p.10.
Panel - Wider, Johnson, Robertson, April 24, 2001, 165:14 -166:16.

**Recommendation: The MoE should commit to providing Ontarians with a comprehensive annual report on the state of Ontario's environment. In the longer term, the state of the environment reporting functions should be assigned to an independent third party, such as the Office of the Environmental Commissioner of Ontario, in order to maintain the independence and impartiality with regard to this activity.**

**Recommendation: The MoE should also commit to providing Ontarians with detailed annual reports on the Ministry's enforcement activities in order to ensure accountability in these areas. The report should be modeled on the annual "Offenses Against the Environment" reports the last of which was released in 1994.**

## IV.B.2 The Public's Right to Know in Relation to Drinking Water

723. CELA and CWC submitted a paper for Part II of the Walkerton Inquiry entitled: "Tragedy on Tap: Why Ontario Needs a Safe Drinking Water Act." The following submissions and recommendations are extracted from the section 3.2 (i) dealing with "Community Right to Know."

724. Since the events in Walkerton, the government has taken some measures towards entrenching the public right to know and communicating with the public in the Drinking Water Regulation which, among other things, requires the owner of a water treatment or distribution system to:

- post a "warning notice" in a "prominent location" if the owner does not comply with sampling or analysis requirements for a microbiological parameter, or if there is a microbiological indicator of adverse water quality but no corrective action has been taken (section 10);

- make available for public inspection various technical and legal documents, such as: laboratory reports; records regarding chlorine residual, turbidity and other operational parameters; statutory approvals, orders and directions; quarterly reports (see below); the Regulation and the Ontario Drinking Water Standards (section 11); and

- submit quarterly reports (also known as "consumer confidence reports") to the MoE (and to users upon request) on the drinking water system's operation, compliance measures, sampling results, and notices (if any) of adverse drinking water (section 12).

725. While these provisions represent a good first step towards entrenching "the community right to know " in Ontario, there are a number of questions and concerns about the scope, content and enforcement of such provisions. First, it should be noted that since the Regulation itself generally applies to large waterworks, these warning and reporting obligations will generally not apply to small public and private water suppliers, as described above. Thus, commercial or institutional facilities which may serve large numbers of the public for prolonged periods of time will not be required to post warning notices, maintain public records, or submit quarterly reports.

726. Second, it is unclear why the section 10 warning requirement is limited to microbiological parameters when other substances (e.g. chemical or radiological) may also pose public health risks. If, for whatever reason, the owner is not carrying out the sampling and analysis prescribed in Schedule 2 of the Regulation for <u>any</u> health-based parameter, then this information should be immediately conveyed to users of the system so that they can decide what precautions, if any, should be taken. Similarly, it is unclear why the public records required under section 11 do not expressly include the engineers' reports required by section 13 of the Regulation. In the absence of an explicit cross-reference to section 13, it can be reasonably anticipated that some waterworks owners will refuse to disclose the engineers' reports on the grounds that they are not listed in section 11.

727. Third, there is some question about the limitations of the quarterly reports required under the Regulation. For example, the quarterly report provisions

do not appear to require the waterworks owner to specifically identify and explain the nature, duration, magnitude or significance of exceedances of health-based parameters, or other instances of non-compliance with prescribed requirements or standards. Instead, all that is required by section 12 is a "summary" of any notices filed with the MoE and medical officer of health pursuant to section 8 of the Regulation. An MoE guidance document on quarterly reports offers some discussion of the suggested content of such reports.[2] However, for the purposes of accountability and enforceability, it would have been helpful for the Regulation (if not the OWRA) to require quarterly reports to more fully explain, in plain language, what happened, why, what steps were taken in response, and what further measures will be taken in the future to prevent a recurrence.

728. Similarly, it would have been helpful if the quarterly report (or at least a detailed summary) were distributed to users (e.g. with their water bills), as opposed to waiting for users to learn that they can request a copy of the report. Interestingly, Bill 96 proposed to require waterworks owners to provide summaries of all testing and sampling results to users with their water bills (section 3), but this proposal was not enacted. In addition, it is unclear why the quarterly reports (or summaries thereof) are not required to prominently display warnings or other information for users who may be particularly vulnerable to waterborne disease through exposure to contaminants known or suspected to be present in the drinking water.

729. Fourth, there is increasing concern about the MoE's willingness to actually enforce these "right to know" provisions under the Regulation. For example, anecdotal evidence already suggests that some municipalities are refusing to provide public access to records required by the Regulation. Similarly, the MoE has confirmed that 35 waterworks owners failed to submit the first quarterly reports, which were due by October 30, 2000. This non-compliance rate prompted then Environment Minister Dan Newman to remark that MoE investigators "will consider prosecutions on a case-by-case basis", and that "the government and the Ministry are determined to ensure that every single water treatment facility and municipality is in compliance".[3] To date, however, it is unknown whether the MoE has laid charges against even a single waterworks owner for failing to comply with the quarterly reporting requirement or any other provision of the Regulation.

730. In any event, the limited scope of Ontario's current "community right to know" provisions become readily apparent by examining such provisions in other jurisdictions. For example, the U.S. *Safe Drinking Water Act* initially included provisions that required public water system operators to notify consumers where there was a failure to meet a prescribed standard, or where

[2] MOE, "Technical Brief: Waterworks' Quarterly Reports to Consumers" (August 2000).
[3] MOE, "News Release: 35 Water Treatment Facilities Fail to Meet Reporting Requirements: Newman" (November 17, 2000).

prescribed monitoring was not carried. The 1996 amendments to the Act expanded the "community right to know" by requiring the annual preparation and distribution of annual consumer confidence reports. In particular, each community water system must annually mail such reports to consumers, and the reports must address the following matters:

- information on the drinking water source;
- plain language definitions of key terms under the Act;
- identification and discussion of any regulated contaminants detected in the drinking water system;
- discussion of any violations of prescribed standards for regulated contaminants, and any related public health concerns;
- compliance status (e.g. variance or exemptions to prescribed standards);
- monitoring of unregulated contaminants (e.g. *Cryptosporidium* and radon);
- direction to contact the Agency for further information; and
- additional information as may be appropriate for public education.

731. Under the Act, systems serving less than 10,000 persons may be relieved of the requirement to mail the reports. In such cases, however, the system operator must inform consumers through newspaper notice that the reports will not be mailed out (but are available upon request) and will be published in one or more newspapers. Systems serving less than 500 persons may elect to simply notify customers by mail that the report is available upon request.

732. Similarly, in Australia, the New South Wales government enacted the 1994 *Sydney Water Act*, which creates both statutory and contractual "rights to know" for consumers, as discussed above in Part II of this Paper. In addition, the Sydney Water Corporation is required to prepare annual reports on all routine water quality testing results, and is further required to post consumer confidence reports on the internet every three months. Such electronic reports are to include:

- details of water quality and quantity within the catchment areas;
- evaluations of the Corporation's effectiveness in water treatment;
- literature reviews regarding drinking water developments; and

- overview of issues related to catchment management.

733. The use of electronic means to collect and publicly disseminate drinking water information has been passed or proposed in other jurisdictions. In England, for example, it is mandatory for the government to post a centralized water database on the Internet. In Ontario, Bill 96 proposed a similar duty on the MoE to establish and operate a "water quality registry", which, among other things, would be used to compile all test results submitted to the MoE, and to contain copies of all approvals issued to public water suppliers (section 6).

734. Although the MoE's current web site contains considerable drinking water information, neither the OWRA nor the Drinking Water Regulation actually requires that this web site be maintained for such purposes. It should be further noted that the existing EBR Registry also does not currently serve these purposes. Significantly, the Environmental Commissioner of Ontario has expressly recommended that the MoE establish "a publicly accessible data management system, including water well records, monitoring information, complaints, inspections and enforcement, and information about contamination and remediation".

735. In summary, Ontario's current "community right to know" requirements are somewhat rudimentary and incomplete. As discussed above, the requirements of the Drinking Water Protection Regulation offer a good starting point, but they should be clarified, expanded and placed upon a firm legislative basis in Ontario's drinking water statute.

**Recommendation: As stated in "Tragedy on Tap, a Part II Inquiry submission, Ontario's drinking water statute should fully entrench "community right to know" principles, and in particular, should include provisions that require:**

**(a) immediate public notice through appropriate means (e.g. news media, signs, internet, etc.) whenever:**

**(i) exceedances of prescribed standards or indicators of adverse water quality are detected including "presumptive" results;**
**(ii) treatment or testing equipment is inoperative or malfunctioning; or**
**(iii) required sampling and analysis is not being carried out;**

**(b) preparation of comprehensive consumer confidence reports which are to be mailed to all consumers on an annual basis, and which address the following matters:**

**(i) source assessment/protection;**

**(ii) discussion of any regulated contaminants or unregulated substances detected in the raw or treated water;**

**(iii) discussion of any violations of contaminant limits or prescribed standards, and related public health concerns, particularly for vulnerable persons; and**

**(iv) discussion of the steps taken to address such violations, and measures proposed to prevent any future violations; and**

**(c) require the Drinking Water Commission (or Minister) to establish and maintain an electronic drinking water registry that summarizes consumer confidence reports, discusses issues and trends arising from such reports, and otherwise serves as a public repository for significant drinking water information (e.g. approvals, prosecutions and orders, State of Drinking Water Reports, etc.).**

## IV.C. FINANCING AND GOVERNANCE OF WATER WORKS

736. One of the issues that arose in the course of evidence was with respect how the water works responsibilities of the municipality, then operated by the Walkerton Public Utilities Commission, was governed and financed. Essentially, the issue is whether PUC Commissioners understood water works issues and the performance of their operation and second whether the PUC had adequate resources to carry out its responsibilities.

Cost Recovery for Water Works

737. Walkerton PUC tried to keep costs down for its customers. Walkerton PUC members felt that keeping water rates low, and particularly, lower than surrounding municipalities was good for the customers of Walkerton.

Hallahan Vol. 19, 43:6 44:19 15/11/00; Hallahan Vol. 19, 207:3 7 15/11/00

738. The Walkerton PUC expenditures for maintenance declined between 1997 and 1998; the current expenditures decreased by about 30% or $90,000 in those years.

Hallahan Vol. 19, 247:10 248:16 15/11/00

Finding

While wise financial management is always a legitimate goal, the Walkerton PUC did not have the resources available to it, or did not request such resource, in order to deliver safe, potable water. This would seem to result from pressure to curb costs and new

expenditures rather than focussing on what was necessary to ensure safe drinking water.

**Recommendation:**

**Municipalities should be required to charge rates sufficient to ensure adequate maintenance and updating of the drinking water system and adequate protection of the quality of the supply.**

**Information and Education of Municipal Decision-Makers Concerning Water Works Issues**

739. The Walkerton PUC did not provide its commissioners with an orientation manual, copies of the applicable legislation, regulations or standards. Nor did it have an express policy requiring commissioners to participate in continuing education.

Hallahan Vol. 19, 238: 11 240:19 15/11/00

740. The Walkerton PUC Commissioners did not receive OWWA mailings and information unless the PUC manager chose to provide it to them.

Hallahan Vol. 19, 244:1 245:2

Finding

The PUC Commissioners were not sufficiently informed of their "business" in providing safe drinking water and as such were not aware of relevant and important issues and matter in the field.

**Recommendations**

**Water works operators must prepare orientation manuals, and keep them current, for their commissioners or municipal decision-makers. The manuals should include copies of applicable legislation, regulations, standards, best practices documents, information about water borne pathogens and other water borne health risks, information about the water works systems under their jurisdiction, standing agendas and other necessary documents for those persons to understand their responsibilities.**

**Water works commissioners or municipal decision-makers must be mandated to attend a minimum number of hours of continuing education per year on topics approved by regulation, including an emphasis on water borne health risks and water works best practices, as well as legislative and regulatory requirements.**

**Water works commissioner or municipal decision-makers should receive all OWWA mailings and packages during their tenure on the water works commission or board.**

**Oversight and Review of Drinking Water Test Results**

741. In Walkerton, the PUC agenda did not ever include discussions regarding water quality or bacteriological test results; nor was there a standing agenda item for these topics.

Hallahan Vol. 19, 53:4-16 15/11/00

742. In Walkerton, there was an inadequate system for receiving, recording, tracking and distributing fax transmissions, particularly with respect to lab results. There was no manual log of faxes received.

Hallahan Vol. 19, 85:3-87:5 15/11/00

**Recommendations:**

**PUC, municipal decision-makers, and water works operators should be required to review water quality and bacteriological test results on a routine basis.**

**Water works operators should be required to retain fax and mail copies of lab results, and to maintain a log of all lab sample results received by telephone, fax or mail, indicating date, lab, sample results and action taken.**

**Both the original lab sample results and the log should be available for viewing by the public at any time during business hours of a water works operator, for at least a two year period prior to the current date.**

## IV.D. TRAINING

743. There are three areas where training is an important issue: (a) training with respect to laboratories; (b) training of MOE environmental officers; and (c) training of municipal water works operators.

### IV.D.1 Laboratories and Training

744. An issue raised in the evidence relates to the degree of training and understanding within private laboratories with respect to microbiological testing of drinking water. This issue is particularly relevant during the time when the provincial testing labs were closed and municipalities like Walkerton began to rely upon the private laboratories.

745. In this regard, it appears that there were deficiencies in training with to microbiological testing of drinking water by private laboratories. For example, with respect to the Walkerton situation,

- there was no formal training for microbiology for Mr. Deakin except for a training course at A&L labs in Fort Wayne, Indiana. That training involved a week long course at A&L's facility at Fort Wayne, Indiana respect to A&L's policies, procedures and "how the company operates and how we do things."

  Robert Deakin, vol. III, p. 262, lines 1-4
  Robert Deakin, vol. III, p. 12, lines 3-5

- there were no microbiologists on staff at the laboratory; and

  Deakin, vol. III, p. 14, lines 14- –17

- there was no training with respect to the testing for bacteria in communal drinking water.

  Deakin, vol. III, p. 257, lines 12 –24; p.149, lines 2 –6

**Recommendation:**

**Private labs undertaking municipal water testing should ensure there is adequate training and capacity for their staff. Moreover, there should be continual training on matters pertaining to new strains of pathogens and other contaminants that could possibly be found in drinking water.**

## IV.D.2 - Environmental Officer Training

746. The Ministry of the Environment has the responsibility to provide adequate and necessary training to its staff. In fulfilling this responsibility, it must ensure that there are appropriate training courses and materials and that are sufficient funds to carry out the tasks.

### a) Who has what responsibilities?

747. The primary client of the MOE Human Resources Branch are environmental officers. The mandate includes technical training, legislation training, health and safety training, as well as other generic skills.

Gildner, April 26, 2001, p. 14

748. The 1995 Learning Policy states the essence of the responsibility of the MOE with respect to training. It states that it is the ministry that "has the

responsibility to assist employees in broadening their skills and knowledge to make them more confident and capable in the role they play within the organization."

Gildner, April 26, 2001, pp. 97-101; Exhibit 307 – Tab 15

749. The document, *Guideline for Preparing the Operations Division Staff Training and Development Plan*, lays the groundwork for the MOE training program. It states:

> "In order to meet evolving work expectations and new knowledge and skill requirements, however, staff require ongoing training and development to enhance, maintain and upgrade their skills and knowledge."
>
> Exhibit 307, Tab 5, p. 1

750. Finally, as Mr. Gildner admitted in response to a question as to whether the MOE had the responsibility to train its employees, he noted:

> "I think it's a partnership, but it's the responsibility of the Ministry to ensure that training is available."
>
> Gildner, April 26, 2001, p. 163

Finding

The MOE has a positive duty to ensure that its staff is appropriately trained and that training resources are available to discharge that obligation.

**b) Adequacy of Training**

751. One issue was whether there were sufficient training resources available to environmental officers, particularly dealing with drinking water.

752. The testimony of John Earl, an environmental officer, gives an example of the lack of training opportunities for communal water. His testimony is as follows:

> Q. So is it fair to say that there wasn't any formal training in the '70s or '80s or '90s with respect to communal water systems?
>
> A. Yes, sir.
>
> John Earl, vol. IX, p. 18, lines 20 to 24

Q. In terms of laws and regulations governing municipal water regimes, I believe there was some discussion yesterday about a training session you attended in the mid-1990s, is that correct? Or have you had any training with respect to formal training with respect to laws and regulations governing municipal water systems?

A. Not specifically, no.

John Earl, vol. IX, p. 19, lines 11 to 18

753. Further, it should be noted that Mr. Earl, when promoted from EO3 to EO4, received no additional training.

Earl, vol. IX, p. 25, lines 1 to 5

754. Prior to 1996, environmental officers participated in two courses, Basic Water Treatment and Surface Water Treatment. In 1996, there was a course developed called Drinking Water Treatment for Environmental Officers. This course as last delivered in 1997. There were a total of 5 sessions from 1986 to 1997 with a total of 91 participant from the Ministry.

Gildner, April 26, 2001, pp. 25-27

755. Clearly, during the mid-1990s, there was a change in the nature of the courses offered by or through the MOE. Exhibit 307, Tab 3 illustrates that there was a shift in training in that it was less scientific and technically based and more generalist in nature.

Gildner, April 26, 2001, pp. 45-6

756. This point is made clearly in a line of questions of Mr. Gildner. He was asked:

Q. … you offer a basic drinking course which probably would be far too basic for the environmental officers in – in Owen Sound; why doesn't the Ministry develop an advance drinking water course, rather than all of these human resources courses and management courses and so on?

A. Well, again, I think there are two questions there. As far as the advanced courses go, they tended to hit a relatively small portion of the environmental officer population. We had difficulties in the past running some of the advanced course just because the demand wasn't there.

Gildner, April 26, 2001, pp. 46-47

757. Another line of questioning reinforces this point:

Q. But the question that I have for you, it would appear from this document that as a result of – of reorganizations, increasing workloads and higher expectations from client groups, that the demand for technical training was expected to increase. And as time went on, obviously we had more certainly cutbacks in – in the middle '90s, '96 '97 and so on, major cutbacks in terms of the Operations Division.

But it would seem that the technical training decreased rather than increased. It seemed to be refoc—the – the Ministry was focussing on non technical course, and that seems to be inconsistent with what this document seems to be saying?

A. I agree there is an inconsistency between the two documents, the '94 document. As time went on I guess the priority within training obviously changed somewhat.

Gildner, April 26, 2001, pp. 90-91

758. In one MOE document, it was noted that: "The number of Technical Training days has decreased substantially. The total number of training days per year has decreased by approximately 35% since 1990."

Exhibit 307, Tab 16 – MOEE Learning Plan, Human Resources Branch, March 1995; Gildner, April 26, 2001, pp. 94 and 95

759. There was also recognition by staff that more training in the future was required.

Exhibit 283, Tab 7

Findings

It is clear that MOE has not developed sufficient training programs for its staff.

With respect to drinking water, it is apparent that there was not a focussed training regime with respect to communal water. In particular, there was little emphasis and focus informing staff and making them aware of new strains of pathogens in drinking water.

As a general trend, there was decreased emphasis on technical training throughout the 1990s.

**Recommendation**

**The MOE should develop and maintain both introductory and advanced courses for environmental officers pertaining to communal drinking water systems. There**

**should be emphasis with respect to existing, and new and emerging, treatment technologies, best practices and new and emerging threats to drinking water supplies. In particular, information pertaining to public health risks emanating from pathogens must be updated frequently and all such staff must undergo frequent periodic training to ensure the dissemination of such information. Such training must include the limits of particular methods and new information about effectiveness of various treatment methods.**

**c) Mandatory Training**

760. It is submitted that not only should there be some basic minimum level of training opportunities available for environmental officers, but these training opportunities should be undertaken in a mandatory way.

761. In the document, "Policy for Training and Development with the MOEE", it is noted that:

> "It should be mandatory for employees to attend training programs which will develop their skills and knowledge to perform the duties of their current position. Since an employee's work environment is constantly changing, it is expected that an employee will participate in training on an on-going basis to perform effectively in their day-to-day functions."
>
> Exhibit 307, Tab 12, p. 4

762. Mr. Gildner, in his evidence, suggested that this document was formally adopted, and at any rate, it was too strongly worded. He noted that: "Certainly it is the responsibility of an employee and the supervisor to identify training priorities, but whether or not specific courses are mandatory for that – for an Environmental Officer attends training, that would be a little strongly worded".

> Gildner, April 26, 2001, p. 162

763. At present, for the most part, technical and abatement training courses are not mandatory for the most part, with some exceptions. (For example, environmental responders training course for those in that area, compliance training for IEB staff, delivery strategies in 1998, training under Bill 82, pesticides training for district level abatement staff.) More recently, all new provincial officers must undertake a compliance level 1 course that pertains to law enforcement, inspection techniques, investigative techniques and legislation.

> Gildner, April 26, 2001, pp. 37-8

764. Within Operations Division, Exhibit 307, tab 6 outlines the four mandatory training courses for provincial officers. These include:

- Compliance Guideline Training, Spring 1995
- Delivery Strategies Spring 1998
- Bill 82 Training
- Level 1 Compliance Course

765. Mr. Gildner was not clear who made these courses mandatory and the process therein.

Gildner, April 26, 2001, p. 169

Finding

There are few mandatory courses that give advanced knowledge and understanding pertaining to drinking water.

**Recommendation**

**The MOE should require environmental officers to undertake advanced training courses on drinking water.**

**d) Resources and Training**

766. There is clear evidence that resources devoted to training have steadily declined, with few exceptions, since the early 1990s.

- A 1994 MOE document notes that on page 1 that "Since 1990-1991, the level of expenditures related to training, staff development and conferences has decreased. The decrease is primarily due to constraints imposed on staff travel and accommodation expenditures." On page 4 of that document, it notes: "Figure 3 – Table 3 indicates that the expenditures have been decreasing since the 1990-1991 fiscal year. In 1990-1991 the ministry was spending approximately 6.6% of its total ODOE on training, development and conferences. This year to date we are spending approximately 3.2% of the total ODOE on training."

  Exhibit 307, Tab 12 – "Background on Training Development and Certification Activities (November 1994); Gildner, April 26, 2001, pp. 90-91

- Table 1 of that document outlines that the number of training days has decreased by 33% between fiscal 1990-1991 and 1994-1995. Exhibit 307, Tab 12 – "Background on Training Development and Certification Activities (November 1994),

- It is apparent that the number of training days as a ratio to the population of the MOE has decreased steadily since the early 1990s.

| Year | # of Training | # of Participants | Ratio –Number of Days Training Days to the Population of MOE |
|---|---|---|---|
| 1990-1991 - | 1937 | 416 | |
| 1991-1992 - | 2014 | 461 | 8.5 |
| 1992-1993 - | 1981 | 478 | 8.4 |
| 1993-1994- | 1297 | 446 | 0.55 |
| 1994-1995- | 1810 | 606 | 0.82 |
| 1995-1996- | 3014 | 1009 | 1.46 |
| 1996-1997- | 1502 | 494 | 0.90 |
| 1997-1998- | 1081 | 312 | 0.72 |
| 1998-1999- | 799 | 357 | 0.56 |
| 1999-2000- | 925 | 277 | 0.67 |
| 2000-2001- | 1729 | 691 | 1.4 |

Source: Exhibit 307, tab 17; Gildner, April 26, 2001, p. 105

MOE HR Branch Training Budgets

| Year | Actual Salaries and Actual ODOE |
|---|---|
| 1990-1991 - | 1,161,000 |
| 1991-1992 - | 1,232,700 |
| 1992-1993 - | 1,088,900 |
| 1993-1994- | 942,800 |
| 1994-1995- | N/A |
| 1995-1996- | 1,021,200 |
| 1996-1997- | 891,700 |
| 1997-1998- | 805,000 |
| 1998-1999- | 917,000 |
| 1999-2000- | 698,700 |
| 2000-2001- | |

Source: Exhibit 307, tab 19; Gildner, April 26, 2001, p. 109

767. Another measure of resources to training in evidence relates to “Ministry of the Environment Investment in Learning”. This table establishes a “Learning ratio” which is calculated on the MOE resources directed to learning ODOE

divided by the total ministry salary and wages. According to this evidence, Exhibit 307, tab 20, the "learning ratio" is described as follows:

| | |
|---|---|
| 1989-90 | 0.92% |
| 1990-91 | 1.00% |
| 1991-92 | 0.91% |
| 1992-93 | 0.52% |
| 1993-94 | 0.36% |
| N/A | |
| 1995-96 | 0.70% |
| 1996-97 | 0.61% |
| 1997-98 | 0.95% |
| 1998-99 | 0.80% |
| 1999-2000 | 1.17% |

768. While this trend shows a decline until the mid1990s and then a slow increase, these numbers of misleading. The ratio is directly affected by a per capita calculation. Hence, as there were dramatic cuts in the 1995-1996 and 1996-1997 fiscal years, the learning ratio went up. There may not have been more money in the system, but less people to train.

Gildner, April 26, 2001, p.116

Findings

There is clear evidence that was provided by the MOE that there has been a steadily decreasing budget and resources for training since the early 1990s. Although there was considerable discussion that attempted to qualify much of this evidence, it is submitted that, in terms of trends of analysis, none of the evidence submitted would contradict this finding.

**Recommendation**

**There is a positive duty on the MOE to ensure that sufficient resources are devoted to training of environmental officers and staff generally.**

Needs Assessments Concerning Training

769. In 1991, the Environmental Officers Training Needs Committee established the Environmental Officer Training Plan. This plan identified different skill and requirement sets for Environmental Officers at EO2, EO3, EO4 and EO5 job category levels. According to Mr. Gildner, the "training plan was developed as a tool for supervisors, managers and staff to identify the skill knowledge gaps that may exist for staff. The key of this approach was a way to identify training priorities, to make a rational plan as to how an environmental officer would go through the training within the Ministry."

Gildner, April 26, 2001, pp. 32-3

770. In 1998, a committee, the Operations Division Training Steering Committee, within the division was established to update this plan with a broader mandate to identify training needs and provide coordination within the division. The steering committee created a divisional training plan.

Gildner, April 26, 2001, p. 34

Findings

While the MOE has done some positive work in assessing needs, there is still considerable work to do in this area.

**Recommendation**

**A full needs assessment for training should be undertaken for MOE staff with a clear component directed to drinking water.**

## IV.D.3 - Waterworks Operator Training

### a) General

771. Operator training was lacking. For example, those running the Walkerton system did not appreciate the importance of the issue of the lack of chlorination of well 7 water. This was not assured by the provincial training requirements. For example, there is no requirement or assurance in the training requirements that operators, especially those who were grand-parented in 1993, have any training regarding specific issues such as microbiological risks to drinking water; or the need for chlorination.

Gildner June 7/01 160:1-161:1

772. There is a long history with respect to MOE involvement in waterworks operator training. A very cursory overview to this history can be described as follows:

1970 – Brampton Training Centre established
1987 - Initiation of a voluntary certification plan for operators with three components:

- education (grade 12)
- experience
- exam

1990 - Ontario Environmental Training Consortium established to provide training across the province through community colleges for utility

operators. There were 16 colleges offering courses. MOE audited courses – course participants would be given a MOE certificate
MOE training at the Brampton Training Centre continued.
October 1990 – last day for application for grandfathering
1991 – proposed Environmental Personnel Certification Act
June 1993 – Regulation 435/93 – under OWRA – requiring all operators to be licensed by February 1, 1994
February 1, 1994 – last chance for grandfathering operators
1995 – OETC ceased operator training – "due to demand issues in the colleges and also coordination problems in the colleges." [Gildner, p. 134 – June 7, 2001]
1995 – Training transferred to Ontario Clean Water Agency
1997 – voluntary certification program (Association Boards of Certification) [Guidelines in Tab 1 of Exhibit 373]
1998 – 8 amendments to Regulation 435 [one of which was due to Red Tape Commission – Gildner p. 40 – June 7]
1999 proposal by OWWA and Water Environmental Association to move Operator Certification Program
1999 – OCWA restricted the training to internal staff [Gildner, p. 136]
2000 – Regulation – Reg. 459/00 – establishes new class of licence– Water Quality Analyst Licence [onsite water quality tester]

Gildner June 7, 2001 – 15-18; 118 to 124, 134

**b) Grandparenting - General**

773. The grandparenting issue is important since the Walkerton waterworks operators were not formally trained; they were exempted from certain training components due to grandparenting.

774. Grandparenting is defined as the waiving of one or more licencing requirements. This was made available on two occasions. One during the voluntary programs initiated in 1987 with the deadline for grandfathering on October 1, 1990. The second was during the mandatory program which was announced in June 30th, 1993 and the deadline for grandparenting was February 1, 1994.

Gildner, June 7, 2001, p. 48

775. In both programs, the ability to receive a grandparented licence was limited to existing operators within facilities. For the voluntary program, the exam requirement was waived provided the other two components, experience and education, were met.

776. For the 1993 mandatory program, the grandparenting scheme allowed the exam requirement to be waived and the education, in part, also. An operator

could receive a class of licence equal to their facility if they met the experience requirements.[p. 50] They would have to pass an exam within three years.

Gildner, June 7, 2001, p. 50

777. Grandparenting was used to ensure that experienced operators would maintain their employment and to ensure that there was a supply of experienced licenced operators readily available to meet the demand throughout Ontario. Unlike the US, grandparented operators' licences are transferable.

Gildner, June 7, 2001, pp. 58 and 60

778. For renewals, there is not an exam requirement, but there is a requirement that the operator verify operating experience in the previous five years. If they do not have that operating experience, they may renew the licence, but they must do so through examination.

Gildner, June 7, 2001, pp. 86-87

779. While grandparenting may have some advantages, a number of important issues arise with respect to the concept.

780. There was no systematic investigation into the quality of experience as a precondition to grandparenting, no criteria, little direction in that regard.

Gildner, June 7, 2001, p. 208

781. Similarly, there are no criteria for what training is required in terms of the 40 hours per year requirement – no required course, no formal instruction from MOE employees, and no programs focussed on small water works.

782. There is no requirement or system in place that would require operators of small systems like that run by Stan Koebel had to know about distribution systems, the chlorination systems, E. coli and coliform, and the significance of the readings.

Gildner, June 7, 2001, p. 212

783. Another criticism was put in this way:

> Q. If you learn the wrong way to do something, then as long as you have a voluntary program in certification, with no continuing education, granted the 40 hours of training, but no real forceful education process, that the mistakes of your predecessor can be perpetuated? Would you agree with that?

I would agree …

Gildner, June 7, 2001, p. 193

784. Further, there has been no effort to go out and find out which grandfathered operators are competent.

Gildner, June 7, 2001, p. 239

**Recommendation**

**It is recommended that a training program be developed that would require compulsory education of operators, including those operators still grandparented in the first grandparenting program.**

**Programs should also be developed for PUC commissioners and municipal decision-makers.**

**Grandparenting – Situation in Walkerton**

785. Stan Koebel's licence was upgraded on Sept 10, 1996 since the Walkerton system was upgraded from class II to Class III]

Gildner, June 7, 2001, p. 52

786. Essentially Koebel only had Grade 12 and 15 years experience and that is all that grandfathering required.

Gildner, June 7, 2001, p. 189

787. Stan Koebel applied and was granted a licence under the initial grandfather provisions for the voluntary operator certification program and then again in 1994 for the mandatory program. At no time did he have to write an exam since he was operating plant within certain previous years. He would continue to receive his renewal so long as he could establish 40 hours of training per year without the need for any formal exam.

Gildner, June 7, 2001, pp. 155-156

788. This is still the situation today, in that the additional training hours required by the new regulation are not specific as to minimum course content, and furthermore, still impose no examination requirement on the originally grandparented operators.

**c) Adequacy of Training Requirements Generally and for Renewals**

789. There is also an issue with respect to the training requirements for renewals of the licences. Essentially, the requirements are:

- 40 hours per year of training
- definition of training is very broad
- records are kept and only inspected at regular inspection

790. In August of 2000, a regulation promulgated by MOE requiring 36 hours of ministry approved training every three years or operators would have to write an exam.

Gildner, June 7, 2001, p. 98

791. A review of Stan Koebel's training record, in CWC's view, is not sufficiently comprehensive and robust particularly with respect to dealing with monitoring, disinfection, treatment and new and emerging pathogens. Indeed, many of those with a role in drinking water were unaware of E. coli 0157:H7 in particular, and even in some cases, of the fact that water systems, including a groundwater system, could be the source of deadly waterborne pathogens.

Exhibit 373 – Tab 23

**Recommendation**

**It is imperative that operators applying for renewals are properly trained. The training requirements should clearly defined and include a number of core elements. In particular, operating training course should be developed and maintained both at the introductory and advanced levels for communal drinking water systems operators. There should be emphasis with respect to existing, and new and emerging, treatment technologies, best practices and new and emerging threats to drinking water supplies. Information pertaining to public health risks emanating from pathogens must be updated frequently and all operators must undergo frequent periodic training to ensure the dissemination of such information. Such training must include the limits of particular methods and new information about effectiveness of various treatment methods.**

**Further, operators should be required to take specified training and obtain an understanding of the reasons for monitoring, disinfection, treatment and of what it is that they are monitoring, as well as the circumstances which can affect the results.**

**d) Accessibility of Training - Cost**

792. Prior to 1990, MOE heavily subsidized training. The cost was about $60 per person for a 5 day course (actual cost may have been $400 to $500). In 1990,

to ensure that the community colleges could actually offer these courses in a competitive manner, the subsidy for training of operators was removed and there was essentially full cost recovery for the course that were offered by the Ministry of the Environment.

Gildner, June 7, 2001, p. 119

793. According to Gildner, this had three effects:

(1) allowed colleges to develop their training courses;
(2) "gave pause" to some of the larger municipalities and as such they developed their own internal training programs;
(3) there was an entry of private sector trainers entering the market

Gildner, June 7, 2001, pp. 119-120

794. Maxwell Christie summarized the situation as follows:

Maxwell Christie: But one of the impacts when Ministry withdrew from this was municipalities or public water authorities probably sent less people on course because when it goes from sixty ($60) dollars a course to six hundred ($600) a course at local – particularly the small community level, that's a pretty big chunk to bit off in your budget.

Q. So while the regulation may be provided impetus toward training insofar as it – it mandated certification of operators and it mandated forty (40) hours of training being given to each operator annually, at the same time with the Ministry of the Environment getting out of the business of training, or – effectively taking away the subsidy, that worked in the opposite direction?

A. Yes…

Gildner and Christie Panel June 7, 2001, p. 126

795. Mr. Christie later stated that these increased training costs were in addition to testing costs that were downloaded to municipalities and as such particularly affected smaller municipalities.

Christie, June 7, 2001, pp. 150-151

**Recommendation**

**The MOE must develop training programs that are financially accessible to both large and small operators. It must also provide sufficient oversight to non-MOE training programs to ensure that they are sufficient and appropriate.**

**e) Delivery of Training for Operators**

796. At present, the only training available now is colleges, private sector training and associations.

797. This situation arose as OCWA withdrew its training services for non-OCWA staff.

798. Mr. Gildner's commented with respect to OCWA's withdrawal of training services. He noted that

> "We have relied in the past on the defence that the Ministry training has simply been transferred to OCWA – a more logical location for operations training. This has deflected criticism towards the ministry for abandoning training, just when it was needed most – when operator certification became mandatory." ….
>
> …but now there may be a perception that the Ministry has given OCWA the benefit of training which was intended for all operators in the province. By OCWA shutting the door to this training, it may be perceived that OCWA with the Ministry's blessing is try to shut out municipalities from effectively running their municipalities.
>
> From a less theoretical point of view, without access to OCWA training, small communities have lost one of the most consistent avenues for training. This is …a big loss, and to some degree will undermine the credibility of the certification progam from two points of view
>
> (1) Operators in small communities will be less likely to receive adequate training and therefore will have difficulty meeting the certification requirement
> (2) Operators/owners in small communities will identify the provincial government (since OCWA is a crown corporation which report to our Deputy Minister) as eliminating training opportunities.
>
> Exhibit 373, Tab 18 [Also found in Gildner, June 7, 2001, pp. 145-147

799. Mr. Gildner was not sure if this is "as a great a concern" since there are more private sector training opportunities.

> Gildner, June 7, 2001, p. 147

**Recommendation**

**The MOE should either develop a core in-house training program or negotiate such a regime with OCWA. While the private sector can have a role in such training, it must be under the close cooperation of the MOE. The MOE must develop the core curriculum.**

### f) Specialized Training Requirements

800. The evidence showed that many of those with direct responsibility for delivery of safe water or for environmental and public health oversight of the water supply system were unaware of E. coli0157:H7 in particular, and even in some cases, of the fact that the water system, including a ground water system, could be the source of deadly waterborne pathogens. For example:

Earl October 30, 2000 p. 14 lines 23-25

801. Historically, "indicator organisms" such as coliforms and E. coli have not been generally understood by those in the water distribution systems to be harmful in themselves; they have been merely understood to indicate that harmful organisms might be present.

Huck Vol. 1, 146:6 - 147:23

802. The evidence also showed that there is no systematic delivery of such information by any ministry or agency of the province. For example, in the evidence about operator training, the witness stated that the province relies on associations such as the Ontario Water Works Association to deliver such information at their annual conventions, rather than including such information in systematic training programs.

Gildner June 7, 2001, p. 149

**Recommendation**

**All participants in the drinking water systems, from operating staff to staff at oversight agencies must be trained as to the available knowledge and information about risks of pathogens in drinking water to human health. This information must be updated frequently and all such staff must undergo frequent periodic training to ensure the dissemination of such information. Such training must include the limits of particular treatment methods and new information about the effectiveness of various treatment methods.**

## IV. E. IMPLEMENTATION OF A SAFETY CULTURE APPROACH

803. Health unit staff and MoE staff did not see their responsibility as being skeptical of PUC staff and/or PUC operations. They emphasized that they worked on a trust basis with PUC's regarding the drinking water system.

Zillinger Nov. 6/00 82:7-11; Nov. 7 7:16-8:12; 10:18-11:9
Middleton Feb. 26/01 85:24-86:8; 116:18-20

804. Ms. Zillinger testified that she was not familiar with the term "safety culture" in her industry, and when it was described to her as an approach that "assumes that things may be going wrong and is constantly skeptical about commitments being made and whther systems are performing as they should", she testified that "I wouldn't describe that as an approach we would take normally, no."

Zillinger Nov. 7/00 26:21-27:7

805. This approach meant that there was more attention, CWC submits, to the "form" and appearance of compliance with the regulations and ODWOs, rather than to in-depth scrutiny and evaluation of the operations and results reported. Examples include the failure of MoE inspection staff to look at and notice systematic falsification of chlorine residual results, as well as the failure to notice systematic falsification of reports as to quantities of chlorine added to the system.

806. Another manifestation of this approach was in the institutional reluctance (contrary to the inspector's recommendation) to take mandatory approaches to enforcement as against municipalities. Again the rationale was, at least in part, one of trust, even in the face of three inspection reports in a row, covering a time frame of six years, showing repeated non-compliance with sampling requirements, chlorination requirements and other issues.

807. One of the consequences of the failure to take mandatory approaches was a highly inadequate follow up system for voluntary abatement approaches. The evidence was that on a voluntary approach, the mere statement of an intention to comply with the deficiencies noted was sufficient to close the occurrence report (and usually occurrence reports were not even used for voluntary approaches). Compared to mandatory approaches, which would require proof of compliance before a matter could be considered "closed" by the MoE officers, the voluntary approach did not provide assurance that the issues had actually been dealt with.

Zillinger Nov. 7 10:18 – 11:9; 19:5-21:2

808. With respect to health unit staff, the result of a non-sceptical approach was an un-verified reliance on statements by PUC staff that there were no adverse results or problems with the Walkerton water during the outbreak

investigation. This also caused repetition of these assurances (or the assumptions that the communications amounted to assurances), to others, such as the media and institutions prior to and even after the issuance of the Boil Water Advisory, and extreme reliance on the assumption that "if there was a problem, I would have expected him/them [Stan Koebel/PUC] to tell us about it". Furthermore, there is no allowance for the PUC operator not understanding the health significance of the issues. There is no evidence that the health unit staff asked probing questions to determine the reliability of the "assurances" that they thought they were hearing. The health unit staff did not ask to see the latest lab sample results, for example. They did not ask about chlorination equipment or levels (although they did have a health unit staff person attempt to sample chlorine levels in the system with a swimming pool chlorine analyzer). They did not ask about even recent or prior adverse results from lab samples.

Stan Koebel Dec. 20/00 43:3-45:2; 52:16–55:14; 97:14-16

809. The culture of trust in municipalities was also demonstrated by the Ministry of Health Public Health Branch in that the manager of the public health branch assumed that fees for service and later privatization of lab services would not create a risk of non-detection of contamination of water supplies because "I would emphasize that Municipalities are a responsible level of government and I would expect them to be acting accordingly."

Demshar May 7/01 333:11-334:5

810. Similarly, Dr. D'Cunha stated that verification of statements by a PUC official might not be sought because "when a public official is dealing with another public official and a direct question is posed, on expects full disclosure."

D'Cunha June 28/01 167:15-22

811. Dr. D'Cunha agreed that public officials operate on a high level of trust as between themselves and other public officials, because of being public officials. He expressed this view even though the health unit responsibility included declaring water safe or unsafe from a health standpoint. However, he also agreed that these decisions, important to the health of the community, should be based on verified information.

D'Cunha June 28/01 168:10-169:1.

**Recommendation**

**All of the agencies involved in delivering or over-seeing public drinking water must implement a safety culture. In particular, agencies with oversight responsibility must understand their role as independent scrutineer of the system and the**

**information they are provided; must seek to verify information; must understand their role to be for public health and safety; and must not replace their responsibilities as over-sight agencies with the trust that they may feel entitled to hold in other public agencies. Notwithstanding such trust, each agency must exercise their role and subject the systems to scrutiny accordingly. As the Walkerton tragedy demonstrates, mistakes can occur in a system, not because any individual or agency wants to provide bad water, but because those involved may not understand the risks and the safeguards and their responsibilities therein. The other agencies are part of ensuring that even when that is the case, safe drinking water will still be provided because of the multiple barriers, the safety net approach, and a culture of seeking verification of important information upon which decisions and judgments are made.**

## IV.F. LEGISLATIVE AMENDMENTS OR REGULATORY REQUIREMENTS

812. Prior to May 2000, there was some degree of uncertainty or confusion among Walkerton PUC staff, regulatory officials and laboratory operators about the legal status and enforceability of the Ontario Drinking Water Objectives (especially the notification protocol regarding unsafe drinking water), as described above. Even former Environment Minister Norm Sterling acknowledged that he was unclear on the precise legal authority of the Ontario Drinking Water Objectives.

Minister Norm Sterling (June 27/01), page 123, 124

813. In part to remedy the non-enforceable status of the Ontario Drinking Water Objectives, the Ontario government previously proposed in its 1990 throne speech to enact a *Safe Drinking Water Act* ("SDWA"). Such legislation was also viewed by MOE staff as being responsive to addressing public concerns about drinking water safety. In analyzing this legislative reform, MOE staff indicated that the annual cost of implementing a SDWA would be "quite minimal" if phased in over a three year period. However, the SDWA has not been enacted to date.

Ex. 363, Tab 1, MOE Memo re Clean Water Program (Sept. 1/92), pages 1-2

814. During his testimony before the Commission, Premier Harris indicated that people have the "right" to safe drinking water, and he committed his government to the passage of the SDWA if such legislation was recommended by the Commission. Former Environment Minister also stated that Ontarians have a right to safe drinking water.

Premier Mike Harris (June 29/01), pages 174-75, 177, 185
Minister Norm Sterling (June 27/01), page 153

815. On the totality of the Part IA and IB evidence, the CWC submits that a SDWA should be recommended by the Commission, particularly in satisfaction of the Commission's Part II mandate. The CWC does not go so far as to suggest that the absence of a SDWA in May 2000 was a direct cause of the Walkerton Tragedy. Conversely, however, the CWC submits that the presence of a SDWA (including enforceable operational standards for waterworks) in May 2000 would, among other things, have provided a firmer legislative basis for the type of mandatory abatement (and/or prosecution for non-compliance) recommended by Michelle Zillinger but ultimately ruled out by Phil Bye of the MOE's Owen Sound office, as described above.

816. In addition, the CWC submits that the presence of a SDWA (including enforceable water testing and notification standards) in May 2000 may have helped prevent the Walkerton Tragedy (or at least minimize the chances of its occurrence) by clearly setting out duties to report and act upon indicators of unsafe drinking water.

817. Well after the events of May 2000 transpired in Walkerton, the Ontario government introduced its Drinking Water Protection Regulation (O.Reg. 459/00), which establishes important new requirements in relation to water treatment, testing, notification and reporting. In the submission of the CWC, the *ex post facto* passage of this Regulation allows the inference that the Ontario knew (or reasonably ought to have known) that the province's pre-May 2000 drinking water regime was inadequate to protect public health and safety. In fact, as described above, health care officials repeatedly advised the Ontario government to entrench a legally enforceable reporting duty prior to May 2000, but this was not done until after the occurrence of the Walkerton Tragedy.

818. While the Commission did not receive extensive evidence about the nature and scope of the new Regulation during Parts IA and IB, a perusal of the Regulation's provisions reveal that some long-standing concerns have not been adequately addressed by the Regulation. For example, the Regulation imposes no mandatory standards regarding well location (or separation distances), nor does the Regulation require municipalities to prepare or implement source protection programs. Similarly, the Regulation requires disinfection as the minimum level of treatment for groundwater, but fails to contain criteria for determining when production wells (eg. Well 5) are under the influence of surface water. Accordingly, the CWC submits that the Regulation, on its face, addresses some – but not all – of the concerns surrounding the Walkerton Tragedy.

O.Reg. 459/00, section 5(1)

819. More fundamentally, the new Regulation (like any regulation) can be amended or even repealed at any time in the absolute discretion of Cabinet. In this sense, a regulation is generally less permanent than a statute.

Minister Norm Sterling (June 27/01), page 153

820. For the foregoing reasons, the CWC submits that a SDWA is required in Ontario, as described in the CWC/CELA submission to Part II of the Walkerton Inquiry. It is beyond the scope of this argument on Part IA and IB to provide a detailed analysis of the rights, remedies and standards that should be contained in a SDWA for Ontario. Nevertheless, the CWC strongly submits that the SDWA should be the legacy of the Walkerton Tragedy, and therefore respectfully urges the Commission to recommend the development and passage of a SDWA as soon as possible.

## PART V - CONSOLIDATED RECOMMENDATIONS

## PART I - GENERAL AND OVERVIEW / SUMMARY

## II.A. PATHOGENS INTO THE AQUIFER

**Recommendations:**

- **Imposing controls over density of application of manure,**
- **Tracking applications of manure and biosolids – for example by way of a publicly accessible data base and requiring oversight and enforcement by the Ministry of Environment,**
  - **Imposing and enforcing extra controls in farming communities on municipal well siting, monitoring, treatment and contingency plans,**
  - **Requiring source surveys and assessments, and**
  - **Requiring source protection measures.**

## II. B. CONTAMINATED WELLS AND TREATMENT FAILURE

**Recommendation: That MOE formulate criteria for assessing whether groundwater supplying a water works is subject to the influence of surface water. The MOE should ascertain the number of wells in Ontario that meet such criteria. In the event that the criteria are met, MOE should assess whether filtration is required for the water works, and should ensure that conditions are imposed in the Certificate of Approval to monitor for chlorine residuals and turbidity levels.**

**Recommendation: The MOE Approval Branch should be required to undertake a review of all Certificate of Approvals for water works and ensure that there are specific conditions relating to:**

**ii. Maintaining specified chlorine residual before the first consumer and within the distribution system;**

ii. **Requiring monitoring and monitoring of specified parameters in the raw and treated water, including descriptions of the location and frequency for monitoring;**

iii. **Ensuring the appropriate operation and maintenance of the waterworks;**

iv. **Requiring owners to ensure protection of the source of the water supply;**

v. **Providing that operators are certified under Regulation 435/93;**

vi. **Developing a contingency plan and procedures and ensure that all necessary equipment is available to deal with any process upset or emergencies;**

vii. **Imposing notification and reporting requirements as stipulated under the Ontario Drinking Water Standards**

**Recommendation: All municipal supplies should be re-assessed periodically as to their sources and catchment areas, and as to potential contamination of same, including assessment of whether a source considered to be groundwater is under the influence of surface water. The definition of the latter term should extend to include not only the immediate influence of surface water (in minutes or hours to days) but also indirect influence of surface water (in weeks to months), as well as sporadic or intermittent influence of surface water. The latter question must be answered based on a sufficient time frame for monitoring for such influence to encompass seasonal variation and extreme events.**

## PART II.D. OVERSIGHT OF DRINKING WATER QUALITY

**Recommendation: Health units' mandatory program delivery for safe drinking water should include proactive responsibility to monitor and review laboratory test results of drinking water samples in the communities within the health unit. Monitoring should include proactive review of all results, adverse and non-adverse to determine trends and frequency of adverse results, as well as occasional taking of samples as an audit practice, and the resources of the health units should be sufficient to allow for this.**

**Recommendation: The roles and responsibilities of each agency to maintain, contribute to and review a data-base of each municipalities drinking water sample results must be specified, and should include over-sight by health units from the public health perspective in particular.**

**Recommendation: Health units should be required to occasionally audit (take their own samples) of municipal supplies in their geographic area and should be provided with sufficient resources to add this task to their safe drinking water programs.**

**Recommendation: The important oversight responsibility of health units must be restored and reinforced in terms of their public health expertise as to safe drinking water. "Safety nets" must be restored in terms of receipt of all data and information, and health units must be required to actively review and make judgments on the adequacy of that information and as to implications for public water safety in their communities. Further recommendations in terms of health units' communications with other responsible agencies, and in terms of public health responsibility in education of operators and others involved in the drinking water system are discussed later in this argument.**

**Recommendation: Health units should immediately disclose to the public all outbreak investigations so that the public is aware of symptoms to watch for; specific cautions as to treatment; and can provide information to the health unit in their investigation. Such advice should be considered integral to the health unit's role in prevention of further spread of illness. Even (and perhaps especially) if the outbreak puts certain sub-populations or vulnerable groups at greater risk than healthy adults, community notification should be provided.**

## II.E. LABORATORY TESTING AND NOTIFICATION (ACCREDITATION & PRIVATIZATION

**Recommendation: All private laboratories should be under a legal duty to immediately report adverse water test results to both the Ministry of the Environment and the local medical health officer. This recommendation is essentially consistent with Regulation 459/00 promulgated in August of 2000.**

**Recommendations:**

- **Consideration should be given for the development of a laboratory best practice to adopt the presumptive results approach. Consideration could also be given as to whether this mechanism could be incorporated into the current regulatory framework.**

- **Notification procedures must be mandatory and consistent across Ontario. Early notification procedures should be pursued and both operators and oversight agencies must be trained to respond to the early notification. Labs must be required to give adverse results to the operator, the MoE office and the health unit office.**

- **Furthermore, laboratories should be required to report presumptive positive results from presence/absence tests to the operator, MOE and health unit as soon as such results are observed. Although the MOE environmental officers**

**did not act upon presumptive reports, there remains a tangible benefit to the procedure. The evidence points to the fact that false positives are rare.**

**Recommendations:**

- **To ensure that there is a comprehensive regime for laboratories that test drinking water, two options present themselves. Laboratories could be required to attain the accreditations and certifications that are now available or those should be developed under the existing regime. Another option is to adopt a licensing regime where labs, whether public or private, must be licenced and as such, must meet set criteria to both attain and maintain the licence. Some agency would be vested with the authority to administer this program. This basic model is derived from the medical laboratory system.**

- **It is submitted that a comprehensive licensing regime, parallel to that of the medical laboratory system is both needed and preferable. The rules of the field would be clearer and more consistent.**

- **While no specific licensing regime is being recommended, the model of the clinical labs legislation is working well and should be the starting place for consideration of the needs of environmental laboratories conducting drinking water microbiological testing. Consultation among the stakeholders would be the first step once a decision is made to pursue this option.**

## II.F. OUTBREAK DETECTION

**Recommendation: There must be systematic improvements to public health surveillance and outbreak detection; there will not always be the opportunity for one physician to notice such connections and outbreak detection cannot be left to such contingencies. There are likely many outbreaks and lower levels of illness from pathogens in water that are missed by the public health system. Without Dr. Hallett's intervention, especially with the long weekend intervening, it may have been several days before the fact of an out-break came to the attention of the health unit, with an even greater delay in investigation the outbreak causes and in ordering a boil water advisory. In a large community, it is even more difficult to detect a water-borne disease outbreak.**

**Recommendation: In addition to the recommendations about access to a data base, proactive review of water system records and clarification of oversight responsibility for routine sampling results made elsewhere in this argument, CWC adds the submission that in an outbreak investigation for any illness for which there is a possibility of transmission by water (treated or untreated), the health unit automatically review the records of the relevant water system/s as one of the initial tasks to be conducted in the very earliest stages of an investigation. This information will assist in providing additional leads and possible focus of an investigation, and may assist in preventing water from being ruled out as a possibility or downplayed too early in the investigation.**

**Recommendation: Sampling should be done by the health unit itself, at many points in a community, immediately upon commencement of any outbreak investigation, even where food is a primary suspected source.**

**Recommendation: In investigating an outbreak that may be waterborne, health unit staff should immediately obtain copies of the most recent bacteriological results for the supply, as well as review other recent records and a data base of results for that community.**

**Recommendation: Health unit inspectors should be equipped at all times with the necessary equipment and supplies for monitoring chlorine residuals and taking independent samples of municipal drinking water supplies.**

**Recommendation: Health units should consider issuing a boil water advisory immediately in a case where it is investigating an outbreak in a community for an illness that may be transmitted by drinking water (treated or untreated) whenever the immediate and initial information shows a broad community outbreak, separate ages impacted (such as young and elderly), and possible connection to the geographical area served by a drinking water system. Health units should not await confirmation of the source nor even probability of the source because of the very large numbers of people in the community constantly exposed to drinking water. A precautionary boil water advisory should be issued based on even a possibility that it is the drinking water.**

**Recommendation: In communications with the public, in addition to publicizing the fact that an outbreak is being investigated, health unit staff should advise as to the sources that are being investigated, and should not advise that boiling of water is not necessary unless and until contaminated drinking water has been definitively ruled out as a source based on verified and reliable evidence obtained by the health unit.**

## II.G. MEDICAL TREATMENT

**Recommendations: The Walkerton Hospital should prepare an emergency plan to specifically address an outbreak of E.coli.The emergency plan should be prepared in consultation with the Public Health Unit, the Ministry of Health, the Ministry of Environment and the Town of Brockton and include the following:**

- **guidelines for admission of patients if an E.coli outbreak is suspected;**
- **protocols for ensuring that information is shared expeditiously and accurately between the hospital and outside agencies such as the Public Health Unit;**
- **protocols on ensuring for referral of patients to other hospitals if required;**

- **protocols on how the hospital would handle phone calls from the public regarding the outbreak;**

- **protocols about how to ensure the public and pharmacies are given timely and accurate information on the method of treatment; and**

- **protocols on housekeeping, obtaining alternative water supply, and disinfection procedures and posting of notices within the hospital.**

## PART III – SYSTEM FINDINGS AND RECOMMENDATIONS

## III.A – MULTI-BARRIER PROTECTION OF DRINKING WATER

**Recommendation: Multi-barrier drinking water protection must include a robust emphasis on at least five elements of the system: source protection, water treatment, distribution, monitoring and response to adverse monitoring results. Furthermore, this system and all of the elements within it must be able to withstand "upsets" to the system.**

**Recommendation: Ontario must map its aquifers and water tables and monitor water levels extensively. Ontario must analyze recharge and discharge conditions for aquifers. Ontario must create reports on the data thus acquired, which must be made publicly available and accessible. Ontario must manage its groundwater and must cease issuing water taking permits without this information.**

**Recommendations:**

- **The best quality source for a municipal drinking water supply that can be found should be obtained. Then a watershed protection plan should be imposed.**

- **All municipalities relying on groundwater should be required to define the source of their supply wells' water; all municipalities should be required to evaluate land use within that area and to initiate land use controls to protect that source.**

- **The zone around a well from where the water is coming to the well should be investigated and mapped. One approach to doing so is to develop a wellhead protection area. In any event, the zone of contribution should be identified, that is the area in which water entering the groundwater system vertically downwards will end up in the well. Zones of transport should also be identified (each contour indicating the time for the water from that zone to be transported to the well).**

- **Land use controls should be imposed within zones of contribution to protect the water source for the well. In doing so, appropriate margins of error must be allowed to account for the fact that they system is dynamic. As additional wells are contemplated or pumped and affect the mapped well, the zones of contribution and transport time must be re-evaluated, and as necessary, land use controls modified.**

- **There should be a provincial source protection policy. This should include overall water management goals and objectives. Source protection should be given priority in land use planning legislation. The overall provincial source protection policy should be implemented in legislation.**

- **There is a need for the province, municipalities and conservation authorities to have effective legal tools, and requirements to establish and implement source protection measures according to the risks in that watershed or aquifer catchment area. Municipal and provincial tools to deal with source protection vis-a-vis risks from agriculture, cattle and farming should be established. Broader source impacts – for example from development; interference with wetland function and others, must be integrated into the approach.**

- **The source of municipal drinking water, once established, should be periodically reviewed. Pre-existing and new risks should be evaluated with appropriate changes to the monitoring requirements or practices; to treatment and to other aspects of a multi-barrier protection approach in place for the system.**

**Recommendations:**

- **All municipal supply systems, both ground and surface water, must be required to monitor flow, chlorine residuals or other disinfection parameters, and turbidity.**

- **All municipal supply systems must monitor for pathogens in both the raw and treated water; and the latter at geographically diverse points around the distribution system.**

**Recommendation: Smaller systems should be required to monitor more frequently so as to minimize the time during which pathogens may be present in the system and consumed by people before they are detected.**

**Recommendation: Includes the need for mandatory monitoring, not only for indicator organisms that might indicate the presence of pathogens, and chlorine or other disinfectant residuals, but also for turbidity and other indicators of surface water influence of ground water sources. Examples of such indicators include spore formers, conductivity, pH variances and disinfectant residuals.**

**Recommendation: The ODWO recommendation to subject 25% of drinking water samples to the heterotrophic plate count test was developed to give the operator and oversight agencies some indication of the cleanliness of the drinking water system. This monitoring should continue.**

**Recommendation: Methods to increase the speed of detection of pathogens, as well as the precise type of pathogens should be pursued; Ontario should provide research funding to assist with development of more rapid and more precise detection methods. Tests that provide faster results must be developed.**

**Recommendation: Continuing assessment and re-assessment of bacteriological drinking water risks and new and more reliable methods of pathogen detection must be constantly evaluated and incorporated into provincial drinking water regulation. Monitoring requirements in the province did not (and do not) require testing for actual pathogens. There are many reasons for this, including the time required for such testing results; the cost of such tests; and the very small statistical probability of finding pathogens in small, relatively infrequent volumes of drinking water, even when they are present. However, the lack of monitoring for actual pathogens in drinking water (such as actual pathogenic bacteria; viruses and parasites) and in source water means that the risk from such pathogens may not be understood by operators or by policy makers. Accordingly, along with the lack of transmission of scientific research and new information about known and emerging pathogens, treatment protocols and other protective measures may not be perceived as necessary. The result is a system that is perceived as relatively static – i.e. the risks are assumed to be known and contained with the existing system or with the particular water works system.**

**Recommendation: Re-sampling procedures should be made more stringent so that it is ensured that the re-sampling occurs immediately and is at a minimum taken from the same location as the adverse sample that was observed. "Re-sampling" by waiting for the following week's routine sampling is not acceptable.**

**Recommendation: Include developing faster responses to indicators of groundwater influenced by surface water. Multi-barrier treatment systems should be imposed even for groundwater systems.**

**Recommendation: Municipalities should utilize multiple disinfection methods to ensure the maximum safety of the water from dangerous microorganisms. A combination of treatments could include chorine, ultraviolet radiation, ozone, and various filtration systems.**

**Recommendation: In considering disinfection methods, municipalities should maximize the safety of drinking water, both at source and through the distribution system, and both from short-term acute pathogen risks and from long-term risks such as carcinogenic trihalomethanes formed from the interaction of chlorine and organic matter in the water.**

**Recommendation: Ontario should invest significantly in water treatment research and in identifying new pathogen risks.**

**Recommendation: A precautionary approach to the drinking water system must be institutionalized so that all of those exercising their roles consider what is the safest course of action to protect community health, especially in the case of uncertainty. The culture should be shifted away from one of waiting for "proven" or "confirmed" evidence of risk, to one of taking a protective or precautionary approach. The discussion in this section provides only a few examples of the differences that might result from such a shift.**

**Recommendation: New distribution systems should be designed to include water quality considerations and existing distribution systems should be reviewed and retro-fitted to take account of water quality considerations such as water age management.**

**Recommendation: Dead ends in a distribution system should be eliminated so that there is flow throughout all aspects of the system at all times.**
**Recommendation: Ontario's regulations and standards and water works operators practices must be stringent to ensure that municipalities monitor pressure throughout the distribution system to rapidly detect loss of pressure or breaks, monitor water tables near water mains, actively hunt for and eliminate cross-connections, rapidly repair breaks with appropriate safeguards, and scrupulously follow standards for new main construction and disinfection.**

**Recommendation: Procedures to eliminate biofilm (such as ensuring no dead ends, regular flushing and regular swabbing) should be developed and mandated to be conducted by every water works distribution system operator.**

**Recommendations: Supply well standards must include the following, and all municipal supply wells should be re-examined to ensure they comply with these standards within a specified period of time:**

- **Well casings must protrude well above ground level**
- **Ground slope must be maintained away from the well head**
- **Annular spacing between the well casing and underlying bedrock formation must be completely filled with sealing material**
- **Well casing should extend as far into the underlying bedrock formation as possible; normally a grouted casing to at least 6 metres; much more may be necessary according to the characteristics of the rock**

- **Well head must extend above the base of the pit, normally at least 30 centimetres**

- **A sanitary well seal must be maintained on top of the well**

- **All joints or pipework entering through the side of the well pit must be sealed with an effective waterproof seal.**

**Recommendation: Groundwater supply wells under the potential influence of surface water should be required to have automatic chlorine residual analyzers, along with automatic alarms and operator notification procedures.**

## III.C. MOE INSPECTIONS

**Recommendations:**

- **The Drinking Water Protection Regulation should specific a minimum frequency of inspection for municipal water treatment plants as well as small water treatment serving the public such as trailer parks and motels. The MoE should ensure that it supplements its inspection programme with a number of unannounced inspections of municipal water works as well as small water treatment plants.**

- **The MoE should ensure that all inspection reports, expert reports, application for certificates of approval and any other relevant documents relating to a municipal treatment plants or a small water treatment plant are stored in a central registry accessible to MoE staff in the District and Regional Offices and by Approvals Branch in Toronto. MoE inspectors should be required to familiarise themselves with these documents prior to undertaking inspections.**

- **MoE inspectors should receive training on conducting inspections of municipal water treatment plants as needed and should be familiar with the legislative requirements pertaining to water treatment plants.**

- **MoE inspectors should be required to specify target dates for any non-compliance matters and should promptly follow up promptly to ensure compliance as opposed to waiting for the next inspection cycle.**

## III.D. MOE ENFORCEMENT

**Recommendation: MoE should ensure that its enforcement approach of environmental legislation and regulations is based on the principles, of independence, timeliness, consistency, effectiveness, and transparency. Specifically,**

- **MoE should ensure that enforcement staff has appropriate resources to undertake enforcement, including access to scientific and technical expertise;**

- **MoE should ensure regular training programmes are provided to enforcement staff;**

- **MoE should set performance objectives and methods of evaluating effectiveness to ensure the effectiveness of its enforcement activities and to set priorities; and.**

- **MoE should provide detailed reports to the public on its enforcement activity in order to ensure accountability in this area. These should be modelled the annual "Offences Against the Environment" reports the last of which was released in 1994.**

## III.E. CONTINGENCY PLANS AND REMEDIATION PLANS; EMERGENCY RESPONSE, CONTINGENCY PLANNING AND NOTIFICATION

**Recommendations:**

- **Immediate and stringent re-sampling, detection of the cause of the adverse result, alterations to the treatment system, flushing water mains to distribute disinfection throughout the system, and shutting off the source/s should all be pursued in case of adverse water sample detection. Boil Water Advisories should be considered in accordance with provincial guidelines.**

- **Boil Water Advisories should be guided by a more comprehensive and precautionary policy. As a general principle, Dr. McQuigge agreed that it is desirable to issue a Boil Water Advisory as soon as possible, even if it is precautionary.**

**Recommendations:**

- **Every community should have in place a means to ensure that residents can be notified of emergencies such as BWAs. Notification should include notification to radio stations, TV, print media, and where possible the use of handbills, loudspeakers and signage in certain areas.**

    - **Provincial boil water guidelines, such as the draft "Protocol for the Issuance of a Boil Water or a Drinking Water Advisory" should continue to be developed to ensure that such measures are standardized.**

**Recommendation: Further to the previous recommendation, in developing protocols for BWA, there needs to be a process whereby the BWA can be communicated with sufficient urgency and direction. The media should be made aware of the BWA protocols or guidelines through awareness and education programs.**

**Recommendations:**

- **It is recommended in the notification procedures recommended above, institutions should be given a special status in that they should be directly notified and notified in a timely manner.**

- **Further, each institution should have their own contingency plans in place for events such as the contamination of water.**

**Recommendation: Boil Water Advisories should be clear and comprehensive and contain the essential information necessary for public protection.**

**Recommendation: Municipalities like Brockton should ensure that it has an Emergency Plan that could be activated in water contamination situations. This should include provisions for broad and effective communication measures to assist the Medical Officer of Health in the notification of Boil Water Advisories.**

**Recommendation: Municipalities, in their emergency or contingency plans, should include measures to ensure that alternative drinking water supplies are sufficient. Provisions should also be included that would ensure those supplies are accessible.**

**Recommendation: PUCs should be required to develop and maintain a contingency or emergency plan. Not only must contingency plans in accordance with the Chlorination Bulletin be made mandatory, but they must be confirmed by PUC commissioners and the MOE inspectors that the plan is in place. A zero-tolerance approach with respect to the failure to have a plan must be adopted by the MoE (see the enforcement section below). Water works and local municipal staff, as well as local health unit staff must be trained as to the content of the contingency plan, its implementation, and a copy of the plan must be stored in a minimum of appropriate locations in the municipality.**

## PART IV. OVER-ARCHING FINDINGS AND RECOMMENDATIONS BY TOPIC

### IV.A. INTER-AGENCY COMMUNICATION AND DATA-SHARING

**Recommendation: A readily accessible data base of all lab sample results for a water works should be maintained by the laboratory and / or works operator, and accessible by MoE, health unit, labs, operator and general public, for a period of a rolling 10 years at a time.**

**Recommendations:**

- **In addition to the adverse result reporting that the August 2000 standard requires, all results should be reported on a data base accessible to the PUC, the health unit, the MoE and the public. The PUC, the health unit and the MoE should have defined specific responsibilities to review the data base at regular intervals; not only when adverse results are reported, to evaluate the condition of the system and to note early warning signs of risks. The data**

**base should include turbidity results and chlorine residuals as well as thE. coliform and E. colilab samples to assist with such evaluation.**

- **Regular communication between PUC staff and health unit staff should be established, with specific agenda items, including discussion of the monitoring results shown on the data base, discussion of new and emerging drinking water health risks and treatment options, discussions of particular concerns such as the infrastructure system condition and equipment robustness, review of contingency response plans in case of early indications of deteriorating water or surface water influence, and periodic review of emergency response plans, among other items. The availability of health unit staff as a resource to PUC staff for health issues should be reinforced.**

**Recommendation: Systematic and regular communication between water works operators and MoE abatement staff must be established. Water works operators must be trained to regard MoE staff as a resource.**

**Recommendations:**

- **Again, regular communication between local MoE staff and local health unit staff, with systematic agendas directed at review and assurance of safe drinking water systems in the communities under their jurisdiction must be established. Furthermore, problems that appear at the local level that may be province wide should be communicated forthwith to the provincial levels of the Public Health Branch and the Ministry of the Environment by the local agencies. (For example, such communication could have occurred when Mr. Gray in Barrie received a letter of concern about non-notification from private labs from the Simcoe County health unit.)**

- **Clarification of roles and responsibilities in a legal framework, such as a Safe Drinking Water Act would greatly enhance the understanding of the need for inter-agency communication and the types of information that must be exchanged.**

**Recommendation: The Public Health Branch has not historically targeted water works operators for education or information dissemination. For example, regarding the cryptosporidiosis / giardia Boil Water Advisory guidelines, Dr D'Cunha agreed that public health information regarding water should be disseminated to operators and MoE abatement staff "by somebody". For health based information in particular, he later agreed that the public health branch would (or should) be the lead. This has not happened historically, but this role should be assumed by this branch of the Ministry of the environment.**

**Recommendation: The provincial level responsibilities for drinking water in public health and in environment, among others, should be coordinated by way of establishment of a single entity or person responsible within the government for drinking water. For example, a Drinking Water Commission within the Ministry of**

**the Environment, reporting directly to the Minister has been recommended by CWC and CELA in the paper done for Part II of this Inquiry, *Tragedy on Tap: The Need for A Safe Drinking Water Act.***

**Recommendation: The labs serving particular water works should be included in regular communications between the water works, health unit and ministry of environment staff so that in conducting the microbiological sampling for a particular water works, they are aware of historical and current issues and trends and can initiate responses or even initiate investigations based on their microbiological expertise.**

## IV.B. COMMUNICATION WITH THE PUBLIC AND PUBLIC'S RIGHT TO KNOW

**Recommendation: The MoE should commit to providing Ontarians with a comprehensive annual report on the state of Ontario's environment. In the longer term, the state of the environment reporting functions should be assigned to an independent third party, such as the Office of the Environmental Commissioner of Ontario, in order to maintain the independence and impartiality with regard to this activity. The MoE should also commit to providing Ontarians with detailed annual reports on the Ministry's enforcement activities in order to ensure accountability in these areas. The report should be modeled on the annual "Offenses Against the Environment'" reports the last of which was released in 1994.**

**Recommendations: Ontario's drinking water statute should fully entrench "community right to know" principles, and in particular, should include provisions that require:**

**(d) immediate public notice through appropriate means (e.g. news media, signs, internet, etc.) whenever:**

- **(iv) exceedances of prescribed standards or indicators of adverse water quality are detected including "presumptive" results;**
- **(v) treatment or testing equipment is inoperative or malfunctioning; or**
- **(vi) required sampling and analysis is not being carried out;**

**(e) preparation of comprehensive consumer confidence reports which are to be mailed to all consumers on an annual basis, and which address the following matters:**

- **(v) source assessment/protection;**
- **(vi) discussion of any regulated contaminants or unregulated substances detected in the raw or treated water;**

**(vii) discussion of any violations of contaminant limits or prescribed standards, and related public health concerns, particularly for vulnerable persons; and**

**(viii) discussion of the steps taken to address such violations, and measures proposed to prevent any future violations; and**

**(f) require the Drinking Water Commission (or Minister) to establish and maintain an electronic drinking water registry that summarizes consumer confidence reports, discusses issues and trends arising from such reports, and otherwise serves as a public repository for significant drinking water information (e.g. approvals, prosecutions and orders, State of Drinking Water Reports, etc.).**

## IV.C. FINANCING AND GOVERNANCE OF WATER WORKS

**Recommendation: Municipalities should be required to charge rates sufficient to ensure adequate maintenance and updating of the drinking water system and adequate protection of the quality of the supply.**

**Recommendations :**

- **Water works operators must prepare orientation manuals, and keep them current, for their commissioners or municipal decision-makers. The manuals should include copies of applicable legislation, regulations, standards, best practices documents, information about water borne pathogens and other water borne health risks, information about the water works systems under their jurisdiction, standing agendas and other necessary documents for those persons to understand their responsibilities.**

- **Water works commissioners or municipal decision-makers must be mandated to attend a minimum number of hours of continuing education per year on topics approved by regulation, including an emphasis on water borne health risks and water works best practices, as well as legislative and regulatory requirements.**

- **Water works commissioner or municipal decision-makers should receive all OWWA mailings and packages during their tenure on the water works commission or board.**

**Recommendations:**

- **PUC, municipal decision-makers, and water works operators should be required to review water quality and bacteriological test results on a routine basis.**

- **Water works operators should be required to retain fax and mail copies of lab results, and to maintain a log of all lab sample results received by telephone, fax or mail, indicating date, lab, sample results and action taken.**

- **Both the original lab sample results and the log should be available for viewing by the public at any time during business hours of a water works operator, for at least a two year period prior to the current date.**

## IV.D. TRAINING (INCLUDING RISKS TO WATER SYSTEMS FROM PATHOGENS, INCLUDING NEW AND EMERGING PATHOGENS)

**Recommendation: Private labs undertaking municipal water testing should ensure there is adequate training and capacity for its staff. Moreover, there should be continual training on matters pertaining to new strains of pathogens and other contaminants that could possibly be found in drinking water.**

**Recommendation: The MOE should develop and maintain both introductory and advanced courses for environmental officers pertaining to communal drinking water systems. There should be emphasis with respect to existing, and new and emerging, treatment technologies, best practices and new and emerging threats to drinking water supplies. In particular, information pertaining to public health risks emanating from pathogens must be updated frequently and all such staff must undergo frequent periodic training to ensure the dissemination of such information. Such training must include the limits of particular methods and new information about effectiveness of various treatment methods.**

**Recommendation: The MOE should require environmental officers undertake advanced training courses on drinking water.**

**Recommendation: There is a positive duty on the MOE to ensure that sufficient resources are devoted to training of environmental officers and staff generally.**

**Recommendation: A full needs assessment for training should be undertaken for MOE staff with a clear component be directed to drinking water.**

**Recommendations:**

- **It is recommended that a training program be developed that would require compulsory education on grandfather operators, eg, a specific number of hours of MOE approved training [some proposal in August of 2000 called for 36 hours of it]**

- **Programs should also be developed for PUC commissioners and municipal decision-makers.**

**Recommendations:**

- **It is imperative that operators applying for renewals are properly trained. The training requirements should clearly defined and include a number of core elements. In particular, operating training course should be developed**

**and maintained both at the introductory and advanced levels for communal drinking water systems operators. There should be emphasis with respect to existing, and new and emerging, treatment technologies, best practices and new and emerging threats to drinking water supplies. Information pertaining to public health risks emanating from pathogens must be updated frequently and all operators must undergo frequent periodic training to ensure the dissemination of such information. Such training must include the limits of particular methods and new information about effectiveness of various treatment methods.**

- **Further, operators should be required to take better training and an understanding of the reasons for monitoring, disinfection, treatment and of what it is that they are monitoring, as well as the circumstances which can affect the results.**

**Recommendation: The MOE must develop training programs that are financially accessible to both large and small operators. It must also provide sufficient oversight to non-MOE training programs to ensure that they are sufficient and appropriate.**

**Recommendation: The MOE should either develop a core in-house training program or negotiate such a regime with OCWA. While the private sector can have a role in such training, it must be under the close cooperation of the MOE. The MOE must develop the core curriculum.**

**Recommendation: All participants in the drinking water systems, from operating staff to staff at oversight agencies must be trained as to the available knowledge and information about risks of pathogens in drinking water to human health. This information must be updated frequently and all such staff must undergo frequent periodic training to ensure the dissemination of such information. Such training must include the limits of particular treatment methods and new information about the effectiveness of various treatment methods.**

## IV. E. IMPLEMENTATION OF A SAFETY CULTURE APPROACH

**Recommendation: All of the agencies involved in delivering or over-seeing public drinking water must implement a safety culture. In particular, agencies with oversight responsibility must understand their role as independent scrutineer of the system and the information they are provided; must seek to verify information; must understand their role to be for public health and safety; and must not replace their responsibilities as over-sight agencies with the trust that they may feel entitled to hold in other public agencies. Notwithstanding such trust, each agency must exercise their role and subject the systems to scrutiny accordingly. As the Walkerton tragedy demonstrates, mistakes can occur in a system, not because any individual or agency wants to provide bad water, but because those involved may**

**not understand the risks and the safeguards and their responsibilities therein. The other agencies are part of ensuring that even when that is the case, safe drinking water will still be provided because of the multiple barriers, the safety net approach, and a culture of seeking verification of important information upon which decisions and judgments are made.**

## IV.F. LEGISLATIVE AMENDMENTS OR REGULATORY REQUIREMENTS

**Recommendation: The Ontario Drinking Water Objectives, Chlorination Bulletin and similar requirements, or their successors must be maintained as regulation or statute and have the force of law in Ontario, applicable to all water works operators, laboratories and others involved in the drinking water system in the province.**