Sydney Water Inquiry

Second Interim Report

Management of the Events

September 1998

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Executive Summary

This Second Interim Report discusses the management by NSW Health and Sydney Water of the events surrounding the contamination of Sydney's water supply between 21 July and 4 August 1998. In the First Interim Report, I discussed the possible causes of those events.

Since those events there has been another major incident when contamination at high and, in some cases, extreme levels was found in the water supply at locations above the Prospect Water Filtration Plant, in the plant and throughout the system. A boil water alert was issued on Tuesday 24 August 1998 and remains in force. It was also found that contaminated water was passing through the Orchard Hills treatment plant which, like the Prospect plant, is fed from Warragamba Dam. These recent events suggest that there has been a significant introduction of *Cryptosporidium* and *Giardia* into the catchment of Sydney's water storages, which is finding its way into the supply system. Whether the cause of the recent events is the same as the first event is not clear. My present view is that it is likely that the two events have different causes. Further intensive investigations are being undertaken and the final chapter of this report indicates the present status of these investigations.

This Interim Report confirms that all of the experts, including those who have previously expressed doubts, are now agreed that *Cryptosporidium* and *Giardia* have been identified in Sydney's water supply at concentrations that are of public health concern.

The investigation of the management of the events considered in this report reveals a number of significant problems. The response to the situation which existed between 21 and 25 July was appropriate and was carried out in accordance with the procedures which had previously been agreed between NSW Health and Sydney Water. However, on Sunday 26 July, Sydney Water became aware of extremely high readings in part of the supply system and, although NSW Health was alerted, there was no effective response. It was not until Monday 27 July that NSW Health and Sydney Water jointly consulted and, with the advice of experts, agreed to issue a health warning for part of the Sydney Central Business District. Even when this was agreed the warning was delayed for a number of hours.

The most difficult day in the management of the events was Wednesday 29 July. Public notification of a continuing alert was

delayed. These communication problems continued and later that evening effective communications proved impossible.

By the early evening, evidence of significant contamination which could affect the whole Prospect system was emerging. It is not easy to obtain a precise account of the events which followed. I accept that in times of crisis recollections may prove faulty. However, I have also gained the impression that some of the information I have been given may have been influenced by a concern about the possible repercussions. I am satisfied that the Corporation was not able to effectively respond to the change in circumstances. It was not until its Chairman, Mr David Hill arrived that a decision as to the area for the health alert was made.

Although results suggesting possible contamination of the total Prospect system had become available, NSW Health officials were not told for some hours of the potential problems. Sydney Water was left to make the critical decision about the area to be the subject of the health alert on the Wednesday evening. There was significant evidence that the Prospect plant may have been the cause of the problem and there was no evidence or suggestion that any other cause was more likely. Nevertheless, a decision was taken to limit the alert to the Potts Hill system. This decision was significantly influenced by Hill. In my opinion, the decision did not reflect appropriate concern for public health.

Because of concerns over the inefficiency of Sydney Water in issuing media releases, Mr Michael Reid, the Director General of NSW Health, was correct in issuing the release on the evening of 29 July in time for the late evening news. NSW Health issued Sydney Water's original draft, which provided a warning for the total Prospect system. Sydney Water attempted to "kill" this release and issued its own which was limited to the Potts Hill system. It also deleted reference to *Cryptosporidium.* These actions caused confusion in the media and uncertainty for the public.

The contradictions in media statements were substantially caused by the lack of effective decision making within Sydney Water. It is apparent that the events were mismanaged. Difficulties continued over the following days when Sydney Water failed to accurately and adequately advise The Hon Craig Knowles, Minister for Urban Affairs and Planning who assumed the responsibility of keeping the public informed.

Sydney Water failed to respond to the initial contamination by implementing an adequate testing regime. Its executive decision making was inadequate. Communications between NSW Health and Sydney Water were initially poor and ultimately broke down

completely. Sydney Water seriously failed to discharge the obligations it owed Minister Knowles.

The events also reveal some failings within NSW Health and confirm the need for adequate management guidance in the event of future significant contamination events and a critical examination of the method by which it communicates public health warnings.

This report also raises a number of issues that require further consideration and will be dealt with in the Final Report. These include:

- the strengthening of the statutory powers of NSW Health to effectively regulate water quality;
- the future structure of Sydney Water and the effective resolution of its three objectives - commercial, environmental and public health;
- the future management of the water supply system, which includes water treatment provided by a separate entity;
- the need for the adoption of an effective protocol and incident management procedures to guide the management of future events;
- the necessity to provide effective and accurate information to the public about threats to public health;
- the future relationship between Sydney Water and Government; and
- the relationship between Sydney Water and its regulators.

During the Inquiry, it has been submitted to me that the Terms of Reference preclude the making of any finding with respect to individuals. Although I have approached my task with a reluctance to make such findings, it would not be possible to fulfil the Terms of Reference without reaching some conclusions in relation to the actions of some individuals.

I am conscious that the Inquiry process has imposed burdens on all who were involved in the events. However, I have taken great care to ensure the parties have been able to put before me all material, including both written and oral submissions, which is relevant to understanding their respective positions. Everyone has had an opportunity to address any issue which could arise in relation to them and I am satisfied that they have all been treated fairly.

At present it is proposed to proceed to a Final Report dealing with all of the matters raised by the Terms of Reference at an early date. If appropriate, I shall provide a further update in relation to causes.

Introduction

This Second Interim Report discusses the management of the contamination events. This was requested by the Premier following the delivery of the First Interim Report, which discusses the possible causes. In that report, I identified a number of possibilities, including catchment area impacts on the inflow to the Prospect plant, contamination at the plant and potential impacts downstream from the plant. I indicated that several possibilities warranted further consideration. This report contains a chapter dealing with the latest information on possible causes.

During the time that the Inquiry has addressed the tasks involved in preparing this Interim Report, many other matters, which fall within the Terms of Reference, have required continuing investigation. The recent further contamination incident has also raised significant issues requiring the attention of many involved in the Inquiry. I am conscious that the Inquiry process has imposed burdens on all who were involved in the events. However, I have taken great care to ensure that all parties have been able to put before me all material which is relevant to understanding their respective positions, including both written and oral submissions, and I am satisfied that everyone has been treated fairly.

The investigation of the management of the events was initially undertaken by interviewing the parties involved. The first meetings were group meetings and were conducted with officers of NSW Health, Sydney Water and three subcommittee members of the Board of Sydney Water, including its Chairman. These meetings revealed that, although on many matters there would be agreement on some important aspects of the events, I would be given different recollections. These differences appeared to be largely confined to the events of the evening of Wednesday 29 July.

I decided to proceed by asking the parties to prepare, where possible, an agreed joint chronology of events. Where they could not agree, I asked that separate statements be prepared to explain each person's recollection. Because of the obligation for me to report urgently to the Premier, I asked that this material be prepared without delay. The officials of NSW Health were able to comply with my request and gave me their updated documents at an early date. I then interviewed some officers jointly to clarify some outstanding issues.

Officials of Sydney Water were not able to meet my request, and although I accept there may have been good reasons for the delay, I became concerned that the Inquiry may be less effective if there was a further delay. I was particularly concerned because I had become aware that there might be diverging recollections within Sydney Water of the relevant events. Accordingly, I asked that relevant Sydney Water personnel attend for a personal interview which was recorded.

After all the interviews had been undertaken I permitted the transcripts and statements to be distributed to any person who had been interviewed by the Inquiry. I obtained accounts of the events of 29 July involving the conversation between Mr Reid and Dr. Andrew Wilson, Chief Health Officer, NSW Health and Mr Christopher Pollett from Sydney Water. I then brought them together for a joint discussion to see whether the relatively few differences in their recollections could be resolved. I had intended that these discussions be conducted after the relevant parties had an opportunity to consider any document which the Inquiry had received which was relevant to the events. It should be noted that Mr Clark of Clayton Utz, the solicitor who appeared for Sydney Water, received one particular document from NSW Health only shortly before the joint discussion had been appointed to commence.

Clark complained about the late receipt of documents and intimated that he may wish the interview to be delayed. I offered him the opportunity to adjourn the meeting which both he and his other client, Pollett, declined. The interview proceeded and I am satisfied it was not compromised in any way by the late receipt of documents.

Subsequently I received letters from Clayton Utz which is Appendix A. The Head of the Secretariat responded to those letters, Appendix B. I have decided to reveal this correspondence because during the past week, the letter from Clayton Utz, was obviously given to the media. Because of a concern which has been raised about the fairness of the Inquiry process, I believe it is appropriate that all the relevant correspondence and related events be included in this report.

During the course of the interview process Hill was represented by Mr G. Downes QC. On Thursday 13 August 1998 Mr T.E.F. Hughes QC. appeared to make representations before me on behalf of Sydney Water. He requested, *inter alia*, that the Inquiry proceed with less speed and that I request an extension of time for my Interim Report. Without responding to this request I asked that Sydney Water provide me with a letter confirming its

position. Mr Hughes asked for time to take instructions on this position and, after a short delay, indicated that his instructions had changed and his client had withdrawn its request.

Notwithstanding the withdrawal of the application, I was conscious that the Inquiry process was imposing significant burdens on many people. I requested a short extension of time for this second report. That extension was readily granted by the Premier.

After completing the interviews, I met with the representatives of the parties to determine the future course of the Inquiry. That meeting occurred on Friday 21 August 1998. Prior to the meeting, any person who at that time had been identified as possibly being the subject of an adverse finding or inference was given a letter which identified the issue or issues relating to them.

The meeting agreed a timetable for the presentation of both oral and written submissions. I offered the opportunity for any party to provide further information or ask questions of any person who had made a statement or been interviewed. That offer was declined in both respects by all parties.

It has been submitted to me that, in the absence of cross-examination, I should exercise great care before resolving a matter in respect of which there is a dispute. I accept that submission. The fact that there has been no cross-examination has played no part in the resolution of any issue. I have had the benefit of speaking with all the persons involved, and my advisers, and I have been able to ask questions that have rigorously tested the account of the relevant events.

The full Terms of Reference for the Inquiry are Appendix C. This Interim Report fulfils the request of the Premier to provide an Interim Report in relation to the management of the incidence of *Cryptosporidium* and *Giardia* in July with a view to determining whether:

- "Sydney Water and NSW Health acted as swiftly as possible to inform the Government and the community of the contamination";
- "determine whether communication between Sydney Water and NSW Health on the issues was effective"; and
- "report on any other relevant matters including the accountability of Sydney Water to the Government and the community".

The final report will also deal with a number of these and related issues. It will also address the issues raised in the public submissions that I have received.

It has been submitted to me that the Terms of Reference may preclude the Inquiry from making any finding with respect to individuals. Although I have approached my task with a reluctance to make findings in relation to individuals, it would not be possible to discharge the requirements of the Terms of Reference unless I reached conclusions about the actions of some persons.

I am appreciative of the efforts of all, particularly the Inquiry staff, in ensuring that this report can be provided in a timely manner.

Background

The Warragamba Water Supply System

Where does our water come from?

Sydney's bulk drinking water supply is largely drawn from catchments on four main river systems - the Warragamba, the Upper Nepean, the Shoalhaven and the Woronora. The water system that supplies the majority of Sydney's population is the Warragamba system. The other systems supply residents of Sutherland Shire, Campbelltown, the Blue Mountains and the Illawarra region.

In the Warragamba catchment, 41% of the water flowing into Warragamba comes from the Wollondilly inflow whose catchments include Goulburn and the Southern Highlands. About a third comes from the Cox's River inflow whose catchment includes Lithgow and the Blue Mountains. Small amounts come from the Nattai inflow which catchments include Mittagong (3%) and the Werriberri (Monkey) Creek inflow (0.5%). The rest (21%) comes from diffuse sources throughout the catchment.

Water is taken from Warragamba and delivered through a long pipeline to Prospect Water Filtration Plant. The Prospect plant supplies about 85% of Sydney's water. Water supplies for the Penrith and Emu Plains areas and lower towns of the Blue Mountains are drawn from the pipeline before it gets to Prospect and are delivered to Orchard Hills Water Filtration Plant. Water supplies for the Warragamba township are also drawn from the pipeline and are treated at Warragamba Water Filtration Plant.

Appendix D shows a map of the Warragamba catchment.

How is our drinking water treated?

All potable water supplied by Sydney Water is filtered, disinfected and fluoridated at one of the eleven water filtration plants in the system. An extensive network of pumps, pipelines, reservoirs and nearly 20,000 km of pipes distributes water from the plants to residents.

Water treatment processes have been developed in recent years which enable many potential contaminants to be removed from drinking water. Chlorine is used to inactivate viruses and bacteria. Parasites which are chlorine resistant, and other matter, are removed by filtration.

Modern filtration plants such as Prospect involve a process of coagulation, flocculation, filtration and disinfection. Coagulation diminishes the particles' charge. This allows flocculation which causes small particles to clump together to form larger particles. Filtration involves passing the water that has been coagulated and flocculated through sand filters. This form of filtration can be expected to remove 99% of particulate matter within the size range of *Cryptosporidium* and *Giardia*. The operators of the Prospect plant claim that their filters remove at least 99.9% of all such particles.

After a period of filtration, the filters become clogged, reducing the flow of water through them. At this point they are "backwashed". Backwashing involves reversing the flow of water through the filters at a high rate to wash free particles which are then collected for disposal. After backwashing, filters are returned to use. The water used to clean the filters (the backwash water) must be cleaned by settling or some other process to remove particles before being returned to the front of the works for re-treatment.

The frequency of backwashing filters depends largely upon the amount of particulate material which is applied to them. The efficiency of particle removal from the backwash water is important to the efficiency of the plant. Unless adequate removal occurs the backwash water can contribute high concentrations of contaminants to the incoming water.

Chlorine is used for disinfection and will kill most micro-organisms including *Giardia*. It maintains a "residual" beyond the treatment plant, inhibiting bacteria from growing in the water distribution system. Chlorine disinfection has a limited effect on the viability of *Cryptosporidium* and accordingly, optimisation of treatment must concentrate on coagulation and filtrations.

After the water has been filtered, it moves through "clear water tanks" which are flexible rubber like structures used to balance flows through the distribution system. While water is in the clear water tanks, some sediment does settle out and collects on the bottom of the tanks. Hence, standard maintenance requires that the sediment is periodically removed. At the Prospect plant, there are two large clear water tanks. Appendix E shows a diagram of the Prospect plant.

How does the water get to our taps?

Water is distributed from Prospect Water Filtration Plant to Pipe Head by tunnels and mains, with some areas supplied directly from these mains. From Pipe Head, water for the inner city, suburbs south of Sydney Harbour and inner western suburbs is carried by tunnel and mains to two large service reservoirs at Potts Hill and then by two tunnels (the Pressure Tunnel and City Tunnel) which terminate at Waterloo and Dowling Street pumping stations.

Water for the northern suburbs and Warringah is supplied by two pumping stations - one at Prospect and one at West Ryde. The water for Ryde is supplied from Pipe Head.

See Appendix F for a diagram of the system after the Prospect plant.

Role of Sydney Water

Sydney Water is a state owned corporation responsible for the operation of systems and services for supplying water and disposing of sewage and wastewater within the areas of Sydney, Illawarra and the Blue Mountains. It collects, treats and delivers drinking water to customers; and collects, treats and disposes of wastewater and stormwater. Sydney Water owns a subsidiary trading arm, Australian Water Technologies, which undertakes most of the water quality testing for Sydney Water. Sydney Water contracts the operation of four of its eleven water treatment plants to private companies.

Under its establishing legislation, Sydney Water has three principal objectives: to be a successful business; to protect the environment; and to protect public health by supplying safe drinking water to its customers. These objectives are of equal standing

Who is responsible for oversighting Sydney Water?

The Water Board was corporatised on 1 January 1995 under the *Water Board Corporatisation Act 1994* (WBC Act), which provides for the establishment of the corporation and its objectives and provides the ongoing powers necessary for operations.

The WBC Act applies the *NSW State Owned Corporations Act 1989* (SOC Act) to the Corporation. In doing so, it transferred the Water Board's assets, rights and liabilities to the new corporation, which is a Company State Owned Corporation.

The SOC Act provides the framework for shareholder relations and the WBC Act provides for the separation of responsibilities of the shareholding Ministers, the operating licence Minister and the regulatory Ministers.

The voting shareholder Ministers are the Treasurer, The Hon Michael Egan, MLC, and one other eligible Minister nominated by the Premier. The current nominated Minister is The Hon Paul Whelan, MP. The non-voting shareholder Ministers are: The Hon Carl Scully, MP; The Hon. Faye Lo Po', MP; and The Hon Gabrielle Harrison, MP.

The operating licence Minister is The Hon Craig Knowles MP, Minister for Urban Affairs and Planning. As such, he is responsible for administering the provisions of the WBC Act relating to Sydney Water's Operating Licence and reporting to Parliament on Sydney Water's operations.

The regulatory Ministers are the: The Hon Dr Andrew Refshauge, MP, Minister for Health; The Hon Pam Allan, MP, Minister for the Environment; and The Hon Richard Amery, MP, Minister for Land and Water Conservation.

Who is responsible for directing Sydney Water?

Under the SOC Act, the Corporation is under the control and direction of a Board of Directors. The Board consists of seven Directors, all of whom are appointed by the voting shareholders, except for the Managing Director, who is appointed by the Directors. In July 1998, the Board comprised:

- Mr David Hill, Chair;
- Dr Judy Messer;
- Mrs Gabrielle Kibble;
- Dr Kerry Schott;
- Mr Penton Sutcliffe;
- Professor John Whitehouse; and
- Mr Chris Pollett, Managing Director.

Who is responsible for managing Sydney Water?

The Managing Director of Sydney Water at the time of the incident was Mr Chris Pollett.

Reporting to the Managing Director are:

- Mr Jeff McCarthy, General Manager, Distribution. McCarthy is responsible for the distribution system including the storage, transportation and treatment of water. Essentially, he manages the system and process which delivers water to people's taps. Reporting to McCarthy are Mr Richard Mackender, Water Network Manager, responsible for the operation of the distribution system network and Mr Michael Keelan, Water Quality Coordinator.
- Mr Geoff Morris, General Manager, Retail. Morris is responsible for customer communications and relations, including billing.
- Mr Ron Quill, General Manager, Transwater. Quill is responsible for the wholesale side of Sydney Water. Quill was nominated Incident Manager on the evening of Wednesday, 29 July. Mr Colin Nicholson, Operations Services Manager, reports to Quill.
- Mr Rod Metcalfe was the Acting Media Manager at the time of the incident.

An organisational chart for Sydney Water, showing these people, is illustrated on the following page.

Sydney Water's Organisation Chart

What regulatory controls must Sydney Water comply with?

The Sydney Water Corporation is bound by the normal controls with which any corporation must comply, including the *Trade Practices Act 1974* and the Corporations Law. It is also subject to some additional public sector controls, such as the *Freedom of Information Act 1989* and the *Ombudsman Act 1974*.

The WBC Act requires the establishment of key elements of the regulatory framework for Sydney Water including: the Operating Licence; the Customer Contract; the Licence Regulator; and Memoranda of Understanding with the regulatory bodies.

The Operating Licence

The WBC Act gives the Governor the power to grant an operating licence to enable Sydney Water to provide systems or services in its area of operations.

The Operating Licence sets out the operating and customer standards to be met by the Corporation in running its business, including drinking water quality standards. It defines the terms and conditions under which the Corporation will operate and establishes mechanisms for customer participation. Further, it defines the guiding principles for relationships with its regulators.

The Operating Licence requires water supplied for drinking purposes to immediately meet the 1980 National Health and Medical Research Council (NH&MRC) Australian Drinking Water Guidelines. It also requires drinking water to meet the 1987 Guidelines according to an agreed timetable to be negotiated in accordance with the Memorandum of Understanding (MoU) with NSW Health (which is discussed below).

Sydney Water presently endeavours to comply with the 1996 Guidelines.

The Customer Contract

The Operating Licence includes a Customer Contract that spells out the rights and responsibilities of both customers and of Sydney Water. The Contract details customers' rights to the supply of water, sewerage and drainage services, consultation, information and assistance, notice of interruption to supply and customer redress. The Customer Contract repeats the requirement in the Operating Licence that water supplied for drinking purposes meets NH&MRC Guidelines. The Customer Contract is legally enforceable.

Should Sydney Water not meet its obligations, a customer has rights of redress under the Customer Contract in a number of instances, including where water quality (including dirty water) or pressure does not conform with Operating Licence standards. In some circumstances, the customer may be entitled to a rebate on the service availability charge. The Independent Pricing and Regulatory Tribunal is addressing the question of the level of rebates Sydney Water should provide to customers disadvantaged by the July contamination incident.

The Licence Regulator

In establishing Sydney Water Corporation, a need was identified to create an independent statutory body to advise the Minister and the Parliament on the Corporation's performance against the operating standards set out in the Operating Licence. The Licence Regulator was established to fulfil this role and is responsible for commissioning of an independent annual audit of the Corporation against the Operating Licence requirements.

The Licence Regulator is required to: monitor compliance with Sydney Water's Operating Licence conditions; inform the Operating Licence Minister about any failure of the Corporation to meet operational standards or any other Operating Licence requirements; and commission an independent annual audit of the Corporation against the Operating Licence requirements. The Minister is required to table the audit in Parliament and decide on any actions resulting from the independent audit and advice received from the Licence Regulator.

Memoranda of Understanding

The WBC Act requires Sydney Water to enter into a separate Memorandum of Understanding (MoU) with each of its regulators, that is the NSW Environment Protection Authority, NSW Health and the Water Administration Ministerial Corporation.

Sydney Water is required by the Act to enter into the MoUs as soon as practicable after the grant of its Operating Licence. Where the parties are not able to agree on a term in a MoU, the Act stipulates that the view of the regulatory agency is to prevail. The Act also requires the regulatory agency to publicly exhibit draft MoUs and consider any comments before finalisation.

There are no provisions in the Act explicitly requiring adherence to the terms of the MoUs. The Operating Licence defines the general purpose of the MoUs, which is to clarify roles and

responsibilities and facilitate cooperative relationships between the signatories.

The MoU with the Environment Protection Authority (EPA) deals with the regulation of Sydney Water in regard to environmental outcomes. For example, the EPA licenses Sydney Water's discharges from its sewerage treatment plants to water and land. The Water Ministerial Corporation (the Department of Land and Water Conservation) regulates Sydney Water's access to water. That MoU confirms Sydney Water's right (provided in the WBC Act) to exercise within its area of operations the right to use, flow and control water vested in the Ministerial Corporation. The MoU with NSW Health is discussed in detail below.

Role of NSW Health

How does NSW Health regulate Sydney Water?

NSW Health has statutory responsibility for protecting public health. It is responsible for regulating Sydney Water in relation to public health outcomes, in particular the provision of safe drinking water. It has two relevant powers.

The Minister for Health has emergency powers contained in the *Public Health Act 1991* and is empowered to take such action, or give such directions, as he/she considers to be necessary in order to restrict or prevent the use of water which is unfit for drinking or domestic purposes or which is suspected to be a risk to public health. The Minister's power has been delegated to the Chief Health Officer in NSW Health.

The second power is the requirement, in Sydney Water's legislation and its Operating Licence, to enter into an MoU with NSW Health. The MoU is required to recognise the Department's role in providing advice to Government in relation to drinking water quality standards and to commit Sydney Water to supplying water which is safe to drink, having regard to the health of the public. The MoU is not legally enforceable by NSW Health and depends upon the co-operation of Sydney Water.

Who are the key persons in NSW Health involved in the incident?

The Minister for Health is The Hon. Dr Andrew Refshauge, MP. His Press Secretary is Mr Julian Brophy.

The Director-General of NSW Health is Mr Michael Reid. The Chief Health Officer, Dr Andrew Wilson, is responsible for the public health arm of NSW Health and reports directly to Reid.

Dr Wilson is responsible for a number of public health divisions, including Health Protection, of which Mr Ross O'Donoughue is the Acting Director. Within the Health Protection Division, Dr Jeremy McAnulty is the Medical Epidemiologist in the AIDS/Infectious Diseases Branch.

A Water Unit has recently been established within the Environmental Health Branch. Mr Adrian Farrant is currently Acting Manager of the Water Unit.

Ms Shari Armistead is the Acting Director, Health Media.

An organisational chart for NSW Health, showing these people, is illustrated on the following page.

NSW Health's Organisation Chart

What does the MoU with NSW Health cover?

The MoU between Sydney Water and NSW Health, setting the framework for communication between the two bodies, was signed in November 1997, after two years of discussions regarding its form and content. See Appendix G.

It commits Sydney Water to meeting the 1996 NH&MRC Guidelines. However it is noted that these guidelines, like water quality guidelines in most countries, do not specify acceptable levels of *Cryptosporidium* and *Giardia* in drinking water, nor do they recommend routine monitoring due to the time and complexity of testing.

The MoU outlines the roles and responsibilities of both agencies, to facilitate effective interaction. NSW Health is responsible for the development of a public water supply regulatory program for the purpose of making independent judgements on public health matters related to Sydney Water's activities. Sydney Water is responsible for assessing the problem and proposing the rectification action in instances where drinking water fails to meet prescribed guidelines.

The MoU sets out a review program and establishes data sharing programs to meet changing health objectives in relation to drinking water.

What does the MoU specify regarding notification of potential health threats?

The MoU specifies that Sydney Water will prepare a comprehensive water quality monitoring plan which meets the intent of the NH&MRC 1996 Drinking Water guidelines. Sydney Water has had a monitoring program for *Cryptosporidium* and *Giardia* in place since 1996.

The management of events of public health significance is governed by requirements set out in the MoU. The MoU requires Sydney Water to provide NSW Health with "immediate notification of any water system event or any monitoring results which indicate the potential existence of a public health hazard". Further, it is to "immediately report to NSW Health any event within its water supply system which may have significant implications for public health." The MoU specifies that a 24-hour incident management contact point for the coordination of responses will be nominated. Sydney Water must prepare and demonstrate to the satisfaction of NSW Health its preparedness for contingency, emergency and disaster response.

Incident Management Procedures

What plans did Sydney Water have for contamination incidents?

In June 1997, Sydney Water produced an Interim Drinking Water Quality Incident Management Plan to ensure effective management of significant or major drinking water quality incidents. A new draft version was in place at the time of this incident.

The draft Plan includes a list of contaminants and the concentrations that will trigger a routine, significant or major incident. In raw water, more than one and less than 100 oocysts/cysts of *Cryptosporidium* and *Giardia* per 100 litres triggers a routine incident; more than this triggers a significant or major incident. In filtered water, 1 oocycst per 100 litres of *Cryptosporidium* or 1 cyst per 100 litres of *Giardia* triggers a significant incident; and more than this triggers a major incident.

The draft Plan states that the Sydney Water Incident Manager should only initiate a significant or major incident in consultation with the Managing Director.

NSW Health has recommended the notification of all microbiological incidents concerning filtered water and major raw water incidents involving *Cryptosporidium* and *Giardia.* The Plan states:

> "Sydney Water, in its management of the community's daily drinking water supplies, holds a great deal of public trust. They trust us to do the job right so they can safely drink our water, and they trust us to fix any problems quickly. How we deal with such incidents – both major and minor – will reflect in the level of trust and respect we receive from our customers, the community and stakeholders. If we do the job right, then the level of trust and support will remain high. Do it poorly and we will lose that trust very quickly….. Doing it right is simple. All it requires is quick thought and appropriate action. Think and act quickly to tell the right people that a problem exists and then think and act quickly within the response team to fix the problem. Delay is the biggest threat to maintaining public trust. Not following procedures is the second. This plan is designed to ensure Sydney Water retains the trust of its customers and the community by outlining the way to deal with water

quality incidents. For best results, know the program and implement it quickly at all times. It is best to react than delay."

The incident management structure for significant and major events, from the draft Plan, is illustrated on the following page.

Draft Plan

Account of Events

As outlined in the Introduction, I asked NSW Health and Sydney Water to develop a joint chronology for the events of the period Tuesday 21 July to Tuesday 4 August 1998. I requested that they reach agreement on the sequence of events wherever possible and, where accounts diverged, highlight those differences in the chronology. The chronology is at Appendix H.

Tuesday 21 July to Sunday 26 July 1998

Tuesday 21 July: the first positive results

The first positive test results for *Cryptosporidium* and *Giardia* were received on Tuesday 21 July. A low level of *Giardia* [3 *Giardia* cysts per 100 litres (3G)] was confirmed at the Prospect distribution chamber. On the same day, low levels of both *Giardia* (2G) and *Cryptosporidium* [2 oocysts per 100 litres (2C)] were found at Potts Hill reservoir. These results were detected from routine sampling of the water system by Sydney Water on 15 July.

On receipt of the results, Sydney Water initiated its incident management process. As required by the Memorandum of Understanding with NSW Health, Sydney Water advised the Environmental Health Branch, NSW Health of the test results. NSW Health advised that the levels did not raise health concerns at that stage and supported Sydney Water's proposal to retest at the positive sites and surrounding areas.

Sydney Water commissioned retests of the positive sites and additional tests of various other sites around Prospect and Potts Hill. Sydney Water also reviewed the Prospect plant's records for 15 July 1998 and found them within specification.

Wednesday 22 July: all clear

Test results received on Wednesday 22 July showed all clear, except one sample from Sydney Hospital that showed a low positive for *Giardia* (0C/1G).

Sydney Water reordered tests around Sydney Hospital and upstream, including the inlet of Potts Hill. It ordered flushing of the local system.

Sydney Water rang NSW Health in the afternoon advising them of the test result and of Sydney Water's actions, which NSW Health agreed were appropriate at that stage.

Thursday 23 July: contamination near Sydney Hospital

Further samples were taken on Wednesday which gave results for the site near Sydney Hospital, received on the Thursday. These showed a higher positive result (43C/19G). Surrounding sites tested showed all clear. Sydney Water notified NSW Health of the test results.

It was believed that the contamination was probably a localised event, resulting from a cross-connection within the hospital grounds. Accordingly, Sydney Water advised NSW Health that a meeting with the Hospital was required.

Sydney Water convened a meeting with Sydney Hospital engineers in an attempt to find a potential source of cross-contamination and it was recommended that the hospital's water storage tank be emptied.

Sydney Water also took more samples from the area downstream from Potts Hill. At this stage Health asked Sydney Water to measure other parameters such as faecal coliforms, heterotrophic plate counts, and chlorine levels. In fact Sydney Water was already doing this.

Friday 24 July: the local contamination theory

The results received on Friday 24 July from samples taken the previous night showed the all clear for all areas tested, except an outlet at Sydney Hospital (1C/0G) and at the Art Gallery (16C/16G), which are both fed from the same main. Sydney Water notified NSW Health of the test results. Sydney Water also reviewed further data from the Prospect plant which indicated that the plant was operating within contract specifications.

Further discussions were held with Sydney Hospital and it was suggested its storage tank again be drained. Sydney Hospital agreed and took action. At this stage, Sydney Water still considered that the contamination problem was localised. I am satisfied that on the available data this was a reasonable conclusion.

Sydney Water also undertook resampling and water flushing in College Street and Crown Street areas.

The Director-General of NSW Health, Mr Michael Reid was first told of the positive readings on Friday and immediately informed the Minister for Health, The Hon Andrew Refshauge, MP who told the Premier. Sydney Water did not tell The Hon Craig Knowles MP, Sydney Water's operating licence Minister.

Saturday 25 July: the first high readings

On Saturday 25 July, Sydney Water received test results which showed the first readings of over 100 *Cryptosporidium* oocysts and *Giardia* cysts per 100 litres of water. Again, only sites in the eastern CBD tested positive.

Tests from samples collected the previous day showed positive levels at the Art Gallery (10C/106G), Macquarie Street (15C/161G) and Crown Street pumping station (10C/5G). Tests of the first flush water from College Street showed high readings (104C/461G).

Sydney Water expanded its retesting program. It also ordered tests throughout a wider part of the Sydney distribution system. This was the first time that Prospect was re-tested since 21 July 1998.

Sydney Water ordered a physical check of Crown Street reservoir but nothing unusual was detected.

NSW Health was called at 6.35pm and informed of the test results from the various city sites and the Crown Street pumping station. Sydney Water suggested that a possible explanation was that cysts and oocysts which may have collected over years in the biofilm lining the water pipes, had been released by flushing of the pipes. Sydney Water agreed with NSW Health that it would search for possible local causes of contamination, but none were identified.

NSW Health was told at 7:30 pm of the high positive results from the first flush water from College Street. It was understood that samples taken from first flush water may not be indicative of the water in the distribution system, as it may be in a dead end section of the pipe or in a hydrant where contaminated compounds may build up. Sydney Water remained of the belief that local contamination resulting from a backflow may still have been the cause.

At this stage, because of the levels measured, NSW Health and Sydney Water agreed that independent validation of the test results by Macquarie University should be obtained.

That night, the Managing Director of Sydney Water, Mr Chris Pollett, was informed of the high readings. He contacted Mr Jeff McCarthy, General Manager, Distribution and Mr Geoff Morris, General Manager, Retail and stressed to them the need to liaise with NSW Health according to the MoU and go through the usual processes in managing the incident. No other action was taken.

Sunday 26 July: extremely high results

On Sunday 26 July, the results received for some sites tested in the Eastern CBD were extremely high. A low result was received outside the Eastern CBD, at Greenacre. The test results received showed extremely high levels in Macquarie Street (376C/3952G), College Street (170C/332G) and the Art Gallery (200C/963G) and lower levels from Crown Street Reservoir (6C/20G). Test results for Prospect plant, Potts Hill, Thornleigh and West Ryde were negative. The City Tunnel at Greenacre showed a low positive result (0C/8G). This was the first positive reading received outside the Eastern CBD (other than the initial low readings from Prospect distribution chamber and Potts Hill).

Sydney Water responded by undertaking a systematic scouring and flushing program for the Crown Street reservoir affected zone. Scouring continued until late in the evening.

Sydney Water's incident management team continued its investigation into possible causes or sources of contamination. This included a visual inspection of Potts Hill reservoir. No problem was identified.

Chlorine levels in the water system, which may indicate the intrusion of contamination or a breach in the system, were also examined and determined to be acceptable. Dirty water complaints received by Sydney Water's call centre were reviewed and found that none had been reported for the Eastern CBD.

Widespread testing of the affected area and surrounding sites was undertaken including tests for a range of health-related parameters in addition to *Cryptosporidium* and *Giardia*.

Pollett queries the test results

Pollett was informed of readings by Morris late on Sunday morning and spoke again to Morris on Sunday evening. He emphasised the need for liaison with Health, but tells me he hesitated to take further action, despite the high results, until second opinions from Macquarie University validating the test results had been received. Pollett states:

POLLETT: "I noted that they were getting second opinions on the high results because we were dealing with …….. sampling at the forefront and these things do need to be validated."

Mr Richard Mackender, Water Network Manager, had similar reservations about the accuracy of the test results:

MACKENDER: "I've never seen G*iardia* of those numbers in the system and at that point, because of that, I wasn't sure whether they were real numbers or whether they were some sort of aberration in the testing process."

It is unclear whether Pollett was aware on the Sunday evening that Macquarie University had validated the previous day's results, which had been received by Sydney Water at about 8:15 pm.

Sydney Water reports to NSW Health

Around 9:00 pm on the Sunday evening, Mr Michael Keelan, Water Quality Coordinator, Sydney Water rang Mr Adrian Farrant, Acting Manager, Water Unit, NSW Health to report the extremely high readings received that day. He also indicated that Macquarie University had verified the earlier analysis. Farrant indicated that he would advise McAnulty, NSW Health's Medical Epidemiologist, on Monday morning, as such levels of contamination should result in disease. Sydney Water reported to NSW Health that they were continuing to flush the local water system to remove possible contamination.

I am told that at this point, no breakdown in the integrity of the system had been identified by Sydney Water. Accordingly there was no basis for assuming that the high readings may have resulted from an ingress of contaminated material such as untreated sewage. At this stage the most feasible explanation given was that the increase in positive readings represented the release of substantial build up in the pipes that was dislodged by the flushing process. If this was the case, Health also expected that the organisms should be dead, especially *Giardia.* There were no reported cases of illness.

Farrant is responsible to the Director of the Environmental Health Branch who is responsible through the Director of the Health Protection Branch to the Chief Health Officer. He took no action when told of the results except to note them. He left it until the Monday morning to report to McAnulty, Medical Epidemiologist in the AIDS/Infectious Diseases Branch who also reports through the Director of the Health Protection Branch to the Chief Health Officer. Accordingly, on the Sunday, although extremely high readings had now been confirmed in part of the system, NSW Health was not giving consideration to the public health response which was required.

Was the management response appropriate?

Given the extremely high levels which had been found, Farrant should at least have contacted his superiors and told them of the latest information. By this stage, given the potentially serious public health consequences, the problems should have been immediately brought to the attention of the Chief Health Officer.

I understand that officers of Sydney Water and NSW Health were faced with an unusual situation, one that they had never previously encountered. However, the extremely high level of independently confirmed results demanded a more urgent response. On any view, these levels justified consideration of a boil water alert and its rejection only after consideration at the highest level. These levels should have caused Sydney Water to respond by questioning the integrity of all components, including the filtration system. Appropriate sampling from the commencement of the distribution system at Prospect should have been instituted without delay. In addition, raw water and backwash water should have been sampled.

Monday 27 July

The Minister is not told

On the morning of Monday 27 July, Pollett and Mr David Hill, Chair, Sydney Water Board, met Minister Knowles, for their regular monthly briefing. Pollett did not advise either the Minister or Hill of the C*ryptosporidium* and G*iardia* readings received. He explains this action by saying:

POLLETT: "Because I was aware that we were meeting – my general managers were meeting with Health later that morning and I wanted to have the benefit of that discussion. I clearly intended to raise it with both of them in my mind that day, but I recollect thinking to myself I'd like the benefit of that discussion with Health because, as someone not involved in the incident, in the investigation, I wasn't sure what the answers were, so I wanted to get those answers and brief the Chair and the Minister when I knew that. I had certainly intended to brief them later that day after they met."

I believe Pollett's action was inappropriate. By this time, Sydney Water had a problem in the system which had extended over a

number of days and had revealed extremely high levels of contamination. If health consequences did emerge, the Government would need to be in a position to respond to the inevitable public concern. Minister Refshauge and the Premier had been informed of the problem the previous Friday. At the very least, Pollett should have informed Minister Knowles on the Monday morning.

Teleconference agrees on action

NSW Health convened a teleconference on the Monday between 11:45 am - 1:15 pm. Sydney Water and experts in water testing, infectious diseases and public health were involved.

Sydney Water suggested at the teleconference that a likely explanation for the contamination was localised episodes of negative pressure, which had allowed the entry of untreated water into the system. The samples tested to date supported a possible theory that an ingress of untreated water had occurred. Sydney Water agreed to continue to investigate the extent of contamination.

After considerable discussion of the options, officials involved in the teleconference agreed that a boil water alert should be issued for the Eastern CBD. There was some discussion about how such an alert should be announced to the public, with Sydney Water opting for a low-key approach with letterboxing and newspaper advertisements. However, NSW Health's view prevailed and a media statement was prepared warning people to boil water within the Eastern CBD. Sydney Water media branch and NSW Health media branch were to liaise on the media release.

It was agreed that the boil water advice would be lifted if further investigation showed that the contamination did not extend beyond the area currently affected and that testing of samples was negative on three consecutive occasions.

Pollett advises Knowles and Hill

Pollett was notified of the results of the teleconference soon after it finished. He was attending a meeting of a subcommittee of the Board at 2:00 pm and advised Hill of the situation before the meeting began. Pollett briefed the other Board members present during the meeting. Pollett advised the Board members of the high readings received over the weekend in the Eastern CBD and that a boil water alert would be issued to the affected area.

Hill agreed that this was an appropriate course of action. Hill states that Pollett's advice was that it was a localised

contamination problem in the Eastern CBD. Hill gained the impression that the positive test results had been obtained the previous Friday.

Pollett called the Minister a little after 2:00pm. The Minister tells me that he was advised of the C*ryptosporidium* and *Giardia* findings in the Eastern CBD region and advised that, although the cause was unknown, it could be the result of earthworks relating to the Eastern Distributor.

Delays in issuing the media release

At approximately 2:00 pm, Ms Shari Armistead, Acting Director, Health Media Unit, says she contacted Mr Rod Metcalfe, Acting Media Manager, Sydney Water regarding the proposed media release. She says it was agreed that the release should contain a message warning people to boil water for one minute before drinking and a warning that people should seek medical advice if they had any symptoms. NSW Health fact sheets on *Cryptosporidium* and *Giardia* were to be distributed with the media release.

Metcalfe's account of this conversation is different. He says he informed Armistead that Sydney Water believed that a media conference was more appropriate than a media release. He says he had previously spoken with Pollett who had agreed to this course of action. Armistead advised that Health did not agree with holding a media conference, on the basis that it would make the issue bigger than it was, and would not participate in the conference.

Metcalfe told Pollett that Health would not participate and that they would have to agree with Health's advice of a media release. Metcalfe began preparation of a draft media release.

Reid's version of these events is different again. He says he contacted Pollett who was involved in a Board meeting and appeared to be unaware that Sydney Water proposed a media conference. He reiterated to Pollett that NSW Health did not support a media conference. He tells me that Pollett agreed that Sydney Water would issue a media release.

Health's fact sheets for both the general public and immunocompromised people were faxed to Sydney Water during the afternoon. Metcalfe says that the first fact sheet was not received until 3:31 pm and the second at 5:30pm. He says:

METCALFE: "On receipt of those fact sheets it was the assessment of me and others in the communications team that they were too detailed and too complex in terms of a simple message for the media, so therefore should not be issued with the media release."

Metcalfe says that he faxed the draft media release to Armistead before 3:30 pm. However, Armistead states that she did not receive it until 5:00 pm, and had called at 3:00 pm and again at 4:00 pm to find out what was happening with the release.

At 5:15 pm, Armistead recommended changes to the release to Metcalfe via telephone. Metcalfe says that she requested changes, including the removal of any Health statement of support for Sydney Water actions. NSW Health requested the completed release be faxed back to NSW Health.

At 6:00 pm, Armistead contacted Metcalfe to ask for a copy of the completed release. Metcalfe advised that the release had been sent out at about 5:45 pm. At 6:15 pm, Health received a copy of the release from Sydney Water. The media release is at Appendix I1.

On any view there was an unacceptable delay in issuing the media release. I cannot resolve who caused the delay. Obviously the debate about the need for a media conference contributed to the delay and was only resolved by Reid contacting Pollett. It is plain that the relationship between Sydney Water and NSW Health was not functioning effectively at this point. The delay in issuing the media release could have had serious health consequences. It also caused NSW Health to form an adverse view of the promptness of Sydney Water's media section, a view which played a large part in Health's decision to issue Sydney Water's media statement on the Wednesday night.

Tuesday 28 July

Results received on Tuesday 28 July indicated some further low positive results from sites tested on the previous day, including Macquarie Street (2C/1G), College Street (4C/6G) and Crown Street Reservoir (0C/14G). Other Eastern suburbs sites tested negative. However, a site at Rhodes also tested positive (0C/4G).

Sydney Water completed a letter box drop to all customers in Eastern CBD area, advising them of the local boil water alert.

Visual inspections and testing of the suction well site, which is the source of the Rhodes supply, were conducted. The Rhodes system was flushed as a precautionary measure. It was also decided to drain the Crown Street reservoir and take further samples throughout the system up to Potts Hill.

NSW Health was provided with the test results and prepared a statement, which is at Appendix I2, for the Sydney Morning Herald explaining why a boil water alert had been issued and the link between *Cryptosporidium* in drinking water and public health. The statement said:

A Statement from NSW Health for Sydney Morning Herald – 28 July 1998

> "Over the past year NSW Health has conducted intense active surveillance for evidence of disease which could be attributed to *Cryptosporidium* in drinking water. So far no disease has been detected.
>
> During the weekend NSW Health carefully monitored reports of water testing from Sydney Water.
>
> On Monday new evidence came to light showing the source of the organisms was possibly due to a problem with the pipes that allowed contaminated water to be sucked in.
>
> It was at that point it was decided a warning should be issued as a precaution.
>
> No relationship has been established between finding *Cryptosporidium* in drinking water at any level (in Australia or elsewhere) and effects on human health.
>
> That means a high level versus a low level does not necessarily indicate an increased risk.

> This is also supported by a large survey of treated North American water supplies that showed that despite the presence of *Cryptosporidium* there was no evidence of human disease.
>
> The lack of association between *Cryptosporidium* in drinking water and human illness may be because the organisms are killed during water treatment processes".

The Sydney Morning Herald quoted this statement in part, including the following.

> "No relationship has been established between finding *Cryptosporidium* in drinking water at any level (in Australia or elsewhere) and effects on human health."

This article is at Appendix I3.

It did not also publish the subsequent sentence that provides the correct interpretation of the known health impacts of *Cryptosporidium*.

I doubt whether in the circumstances it was wise to publish this statement. The selective reporting by the newspapers could have had serious consequences. My understanding is that *Cryptosporidium* may not be killed during water treatment but in an efficient plant most will be removed from the water supply. Furthermore, only one species, *C.parvum*, is a problem for humans. If it is present in the water, it may have very severe consequences for those who are immune deficient. The publication by the Sydney Morning Herald of only one paragraph caused Sydney Water to limit its media release on the evening of 29 July to a warning with respect to *Giardia* only.

These events also demonstrate that when a public health alert is issued, it should be made by only one agency. NSW Health is best placed for this role and should monitor all reporting and take steps to ensure that the correct message is communicated to the public.

Wednesday 29 July

Update of boil water alert for the CBD

On Wednesday 29 July, after further low positive results, a meeting was held at 1:30 pm between Sydney Water and NSW Health to discuss an extension of the boiled water alert. The NSW Health media unit contacted Sydney Water's media unit prior to the meeting and suggested that a draft media release be

prepared for approval by the meeting. Sydney Water's media unit indicated they preferred to await the advice of the meeting as to whether a media release should be issued or a lesser strategy of advertisement and letterbox drop be adopted. Regrettably, there was confusion about the outcome of the meeting. NSW Health believed they had agreed that a media release would be issued while Sydney Water left the meeting believing that an advertisement would be issued. When NSW Health did not receive a media release, they became concerned. It was only after Reid spoke to Pollett and with his Minister's office, which then spoke with Minister Knowles' office, that the media release was issued. This occurred at 5:45 pm. It is obvious that relationships between the media units were further deteriorating. They totally broke down later that day.

Problems at Prospect 5:30pm

During most of the day of 29 July, executives of Sydney Water were monitoring the situation. There was a general belief that the levels of contamination would continue to fall and they expected that the system would be given the "all clear".

The position changed significantly at about 5:30 pm when a reading from a sample taken from the sediment at the bottom of clear water tank No. 1 at the Prospect plant became available. The Prospect plant operates to cleanse water which is fed from the dams upstream. After water has been through the filtration process at the Prospect plant, it passes into clear water tank No. 1 and then into clear water tank No. 2. From there it enters the distribution network. Contamination of the sediment in clear water tank No. 1 meant that there was almost certain to be contamination in the No. 2 tank. The No. 1 tank had been taken off line for routine maintenance on 22 July, but the No. 2 tank remained in service to balance the system. It was almost certainly contaminated and had the potential to introduce pulses of contaminated water into the system. These matters were discussed in the Inquiry's First Interim Report.

The Sydney Water executives who were first made aware of this reading were located in the Operations Room of the Head Office building. Their recollections are generally consistent. They had difficulty in interpreting the result, being unsure of the meaning of a volume of contamination expressed in a quantity of sediment as opposed to a reading in water with which they were more familiar. The conclusion they reached was that the measured level was high. It was a new and disconcerting element in the available data and suggested, for the first time, that the

contamination was present at the Prospect plant that serves 85% of the Sydney water system.

Apparently a clear reading had been obtained at the outlet of the Prospect plant the previous day. No doubt this caused some confusion. However, at 7:00 pm, a positive reading was returned for the water in clear water tank No. 2 (2C/1G) which should have caused added concern.

It is apparent that discussions about these results continued with various executives participating from time to time, although no particular individual was in control. The available data also included two negative readings from the Potts Hill reservoir. The readings, which had been received before 7:00 pm, were apparently taken from the perimeter of the reservoir. Potts Hill is an old facility, which is not covered and is a potential source of contamination of the system. It appears that these negative readings confused the picture. Some assumed that the source of contamination of the system might be limited to Potts Hill.

NSW Health was not told of the sediment or the clear water tank readings until after 9:30 pm. This was a clear breach of the MoU. If they had been told, the opportunity to consider the position and consult with experts would have been available.

Problems at Potts Hill 7:30 pm

The situation changed further at about 7:30 pm when results were received from the centre of the Potts Hill reservoir showing levels of 10C/48G. There were now three possibilities. Either contamination was entering at the Potts Hill reservoir, was coming from the Prospect plant, or was entering the distribution system below the plant. Given the high levels which had previously been recorded near the CBD and the now confused pattern of readings, Sydney Water faced a major problem. From the available information, it was possible that the whole system downstream of Prospect was contaminated at a high level. A timely and conservative response was required.

NSW Health was not told of the further reading until after 9:30 pm. This was a further breach of the MoU.

Executive discussions 7:30 – 9:30 pm

Between 7:30 and 9:30 pm discussions continued in the Operations Room. Efforts were being directed to attempts to understand the source of the new contamination and the likely response of the system.

Mackender, whose job was to manage the water distribution network, appears to have had the best understanding of the distribution system. He was of the view that they had a large problem and assumed the contamination was in the clear water tank at Prospect. He believed that with careful operation they might be able to manage the problem by balancing the flow and cleaning out the system but was not certain this could be done. It would require a delicate manipulation of the system. If this failed, further contamination would be released.

He also tells me that another executive reminded the meeting of a problem that occurred in 1996 when algae contaminated the system. Apparently, high readings were first confirmed in the CBD and only later was it established that the whole system was contaminated.

There were other theories. The possible source of contaminant in the catchment, which had come through the Prospect plant in pulses, was discussed. The assumption was that the earlier events had been caused by one pulse and that another was in the process of moving through the system. Another theory being considered was that both Potts Hill and Prospect were potential sources of contamination. Yet a further theory was that a dead animal might be contaminating the Potts Hill reservoir.

There can be no doubt that the evidence, which was now available, pointed to the Prospect plant as one possible source of the contamination. It followed that the whole system could be contaminated.

Pollett says he was unaware of these discussions. He says he left the office at about 6:35 pm without having brought himself up to date on the situation. It is surprising that he had not at least been told of the evidence of contamination at the Prospect plant.

The discussions continued without conclusion until a decision was made at about 8:45 pm to request Morris and Pollett to return to the office. The consensus was that there was a major problem requiring the presence of the Managing Director. McCarthy called Morris, who contacted Pollett at about 9:00 pm on his mobile telephone. Pollett says Morris told him there was a "new situation" and gave him the Potts Hill and Enfield readings but

did not mention the Prospect readings. Morris confirms this. Pollett said he would come in. McCarthy also called Pollett and confirmed that he was coming in, but says that he gave him no other information.

In the meantime Mr. Ron Quill, General Manager, Transwater, tells me that he left the office not long after the sediment result in clear water tank No. 1 at Prospect became available. Around 8:30 pm, he contacted Sydney Water operational staff from home to request that the Upper Canal, from the Upper Nepean dams to Prospect Water Filtration Plant, be shut off. He said that, as the manager responsible for the bulk water supply system, he knew the canal very well. He said:

QUILL: "I thought to myself, well, we don't really need the canal for supply purposes. There was a risk potentially of something else coming down the canal. I'll just turn it off, shut it down and I gave that instruction".

It is apparent that Quill believed the source of contamination may be upstream of the Prospect plant.

Extra samples

About 9:00 pm, a decision was made to order additional samples throughout the Prospect system, the results of which would not be available until the following day. This sampling was undertaken because it was assumed that the contamination might be coming from the Prospect plant. Samples were obtained from Palm Beach, Brooklyn and Cronulla, which are the extremities of the Prospect system and are not supplied by Potts Hill. These samples would not be contaminated if the problem was localised to the CBD or if the problem came from Potts Hill. It is obvious that by the time this decision was made, the executives had concluded that there was a possibility that the whole of the Prospect system was contaminated.

There was some further information. The Operations Room was aware of negative readings from samples taken on 25 July at Ryde and Thornleigh. The negative results suggested that the contamination might not have gone through the whole system. However, as they were four days old they were not particularly meaningful. They certainly could not be the basis for any present assessment of the state of the system. At best they may have confused the picture. If the cause was at Prospect, a confined event was unlikely, if not impossible.

Pollett talks to Reid

Pollett immediately returned to the office. His first action was to seek out the telephone number of Reid. About 9:30 pm, Pollett left a pager message for Reid. Reid returned the call on his mobile phone.

Because of the later events the recollections of both are significant.

Pollett tells me he said:

POLLETT: "Sydney Water has just received data that indicates there is a *Cryptosporidium* and *Giardia* incident in addition to the one in the Eastern Sydney CBD. There are reasonably high levels of *Cryptosporidium* and *Giardia* at Potts Hill reservoir and further downstream. This indicates that there is more water containing C*ryptosporidium* and *Giardia* in the water supply system. I think a wider alert to the public is now needed. Sydney Water wishes to consult NSW Health, in accordance with the established protocols."

After speaking with Reid, Pollett spoke with Wilson. Pollett tells me that, in course of this conversation, Wilson said to him:

WILSON: "I am more concerned with the *Giardia* levels than with the *Cryptosporidium* levels. In my view the levels indicated probably require a 'boil water' notice to the affected areas as a precautionary public health measure".

Pollett says that he replied:

POLLETT: "I will have to get further advice on the situation."

Pollett also recalls speaking further to Reid and saying:

POLLETT: "Andrew Wilson has confirmed that Sydney Water should issue a precautionary notice."

REID: "I am at a dinner with Health Ministers and I will tell the Minister of Health."

POLLETT: "I will arrange a draft media statement for Sydney Water to issue in accordance with the approach adopted and agreed on between Sydney Water and NSW Health earlier this week."

REID: "Yes, I agree that you should put out a further alert but that before it goes out you should run the words past our media people; please call Shari Armistead." (NSW Health's media person.)

POLLETT: "Yes I will organise that. I am now going to assess the situation with my senior people."

The recollection of these conversations by both Reid and Wilson is not the same as Pollett's. Reid tells me that his recollection is that Pollett said to him:

POLLETT: "The contamination is broader than first thought. We have another set of results from further upstream."

Reid says the results were read out to him indicating levels of *Cryptosporidium* and *Giardia* in the Potts Hill reservoir, the city tunnel and the pressure tunnel at Enfield. He says he was given a clear indication that Pollett believed that the likely source of the contamination was at Prospect.

Reid and Wilson were using the same telephone. Wilson tells me that he asked Pollett to repeat the results, which he had previously read to Reid. Wilson says he asked what were the likely areas in which the contamination would have an effect and recalls Pollett asking someone else to indicate the likely areas for an alert. Pollett's reply, below, would mean that the areas affected included the whole of the Prospect system:

POLLETT: "All of Sydney except Blue Mountains, Penrith, Campbelltown and Illawarra".

Both Reid and Wilson believe Pollett told them that a boil water alert should be issued for the entire Prospect system. In contrast, Pollett's account of the conversation contains no reference to Prospect. If Reid was not told about the readings at Prospect, this was a further breach of the MoU.

I am not able to determine the precise conversation. However, I accept that the NSW Health officials gained the understanding that the alert may be for most of Sydney and that Prospect may be the source of the contamination. It is also plain from Pollett's subsequent action that, at that stage, he believed the alert might be for the whole Prospect system.

There can be no doubt Pollett told Reid that he was uncertain about the source of the contamination. This is confirmed by the fact, which Pollett substantiates that after 10:00 pm Reid rang

Pollett to inquire as to the latest position regarding the cause of the problem.

Reid and Minister Refshauge were together at a Health Ministers' dinner. I understand that Minister Refshauge concurred with the advice given by the Chief Health Officer to extend the boil water alert. Mr Julian Brophy, the Minister's Press Secretary who was also present, advised that it was important to issue a media statement as soon as possible in order to catch the late news on television. NSW Health quite properly believed an alert should go out as soon as possible. With the information now available, it is clear that any further delay was inexcusable.

The telephone conversation between Pollett and Reid ended with an agreement that the respective media people of both organisations would liaise in relation to the issue of a media release.

Reid then paged Armistead and informed her of the need for a broader alert. She was given to understand that quick action would follow.

Pollett phones Hill

After Pollett had spoken with Reid and Wilson, he rang Hill. Hill was out and he left a voicemail message. This was at 9:31 pm. As Hill had not returned his call, Pollett called him again, reaching him at 9:46 pm. I am satisfied that Pollett was anxious and unsure of the appropriate response to the latest information.

It is not clear to me whether Pollett requested Hill to come to the office. However, Hill says it was made plain that his presence would be welcomed.

I have no doubt that Hill had reservations about the capacity of Pollett to deal with a crisis. He made this apparent during the course of our discussions. The lack of a timely response by Sydney Water to the Prospect and Potts Hill readings suggests that Hill's judgement was correct. Hill identified that Pollett was in need of support and acted appropriately by coming to the office. His presence expedited the ultimate decision by Sydney Water as to the area of the alert.

The media release is drafted

Metcalfe, Sydney Water's Acting Media Manager, tells me he arrived at the office at about 9:35 pm and went to the Operations Room where he spoke with Mackender, Morris, McCarthy and some others. He says he was told that the test results were showing *Cryptosporidium* and *Giardia* across the Prospect

system and it was likely that a boil water notice would have to be issued for that system later that evening. He was requested to make appropriate preparations immediately, to draft a media release and take steps to ensure that sufficient staff would be on hand to deal with the inevitable public relations difficulties.

Metcalfe tells me that Pollett came to him a little before 10:00 pm and asked about the media release. He looked at a draft which contained a warning for the whole of the Prospect system. Pollett did not change the draft. He told Metcalfe to run it past NSW Health and "get them to sign it off". Metcalfe says he spoke to Armistead at 10:15 pm and again at 10:25 pm. Armistead says he only called once, at 10:25 pm. At that time, he read her the release and she requested one change.

Metcalfe was aware that the media release needed Pollett's ultimate approval and could change from his original draft. However, he says that he was never given to understand that there could be any change in the area to be affected. His understanding throughout was that the alert would be Sydney wide.

Pollett has a different recollection of the sequence of events. He says that after his unsuccessful call to Hill at 9:31 pm, he spoke with Metcalfe saying:

POLLETT: "Please prepare a draft media release for 'boil water' along the lines of Monday's release in the CBD. You should consult with Shari Armistead of NSW Health in preparing the draft. Sydney Water is going to release the statement as we did on Monday. I'm going to get advice from our General Managers and other experts on what areas are affected. When you prepare the draft media release, please include, at the moment, the whole of Sydney, but not Blue Mountains, Illawarra, Penrith, North Richmond and Macarthur."

Metcalfe does not suggest that Pollett asked him to draft the release. However, it is apparent that at least Pollett read Metcalfe's draft which covered all of Sydney. Whatever the correct sequence of events might be, it is apparent that before Hill arrived, Pollett had accepted that preparations should be made on the basis that the health alert may be for the whole of the Prospect system.

Pollett goes to the operations room

After speaking with Hill, Pollett went to the Operations Room. He says he joined the discussion and recalls debate about the role of Prospect plant in the contamination. The meeting remained unsure as to the area that might be affected. No further data was available. There were two matters that needed to be considered. First, the source of the contamination had to be identified and, if possible, dealt with. Secondly, and of greater urgency, was the need to release an appropriate health alert.

I have been told by the executives that, even after having talked over the matter for several hours in the Operations Room, they had been unable to conclude a view about the likely sources of the contamination or, more significantly, the most appropriate health alert. If this is correct, they were obviously unable to give Pollett clear advice.

Each of the executives gives a slightly different impression of the meeting.

Mackender tells me that, by the time Pollett came into the room, he knew they had a large problem at Potts Hill, and a potential problem at Prospect. He says this was explained to Pollett. He tells me he was not asked to advise in relation to possible health warnings although this was discussed around the room. His impression was that the view of the room, being the view of the technical people, was that all of the Prospect system should be warned. However, he could not confirm that other individuals were of that view. Some obviously maintained that it could be a localised incident.

Quill arrived during the discussions. When he arrived in the Operations Room, Pollett was present. Quill tells me that the discussion had now become centred upon the extent of the boil water notice which should be issued. He said that he agreed with the idea that the contamination had come through Prospect and that the whole system was a risk, but says the extent of an alert had not been resolved before Hill arrived.

Hill arrives

Hill arrived a little after 10:00 pm. He first went to the 23rd floor, where the Boardroom, Managing Director's office and media people were located.

He says he heard a:

HILL: "tremendous amount of noise."

and observed about ten people in a high state of excitement. It was:

HILL: "not a situation that I would say, in management terms, is under control".

I have no doubt his description is correct.

Hill tells me that he overhead one of the media people asking her superior whether the Department of Education should be alerted. Hill intervened to tell her that she should not phone anyone yet. Before going to the Operations Room he asked whether any media statements had been issued. He was told that there was a draft, which was awaiting Pollett's approval. He looked at the draft and noted the words 'severe diarrhoea' and 'urgent'. He thought the language alarmist but says he did not take particular note of the area identified in the alert.

Metcalfe told Hill that he was liaising with NSW Health on the media release, but otherwise it had not gone to any other person. Certainly nothing had been released to the media.

Hill goes to the operations room

I have a number of accounts of the events which occurred when Hill went to the Operations Room. McCarthy indicates that Hill arrived and said:

HILL: "I hope you blokes know what you're doing."

HILL: "Do you realise that what you're doing here will affect the organisation for the next ten years, and probably longer than that."

McCarthy described these as very challenging statements.

Quill recalls that in his opening remarks Hill appeared to be questioning whether an alert was necessary at all. His recollection is that Hill came into the room and the first thing he asked was:

HILL: "Why do we need to issue a boil water notice?"

Quill infers that Hill did not understand the process, or the rationale behind a boil water alert. It was explained to Hill that it was because of the high levels. Hill then indicated that he wanted more information.

Mackender's recollections

Mackender confirms that he used a large map to explain the test results and their consequences. He says that throughout the discussion Hill repeated, on a number of occasions, the words:

HILL: "tell me the facts". "Where have you actually observed this parasite? Where have you actually observed it?"

The response was:

MACKENDER: "Well, it's here and here."

And at one stage Hill apparently said:

HILL: "Well, you're talking about a narrow strip towards the city."

Mackender says he took time to point out to Hill that the strip was a tunnel with various offtakes. Having identified contamination at Enfield, there were areas north and south of the tunnel which would be likely to have contaminated water.

Mackender says he told Hill about Prospect and there was a discussion about its relevance. Hill said:

HILL: "Have you got any observations there which indicate there's a problem?"

Mackender said they had clear readings downstream at the Prospect plant although they already had experience with clear readings being obtained from areas that were later shown to have been contaminated. He was not prepared to conclude from those clear readings that Prospect was not the source of the contamination.

At one stage Mackender tells me that Hill said:

HILL: "I don't want to know about your theory, I want to work on the actual data you've got where there is a problem."

I understand this to mean that he wanted to know about where contamination had actually been measured in the mains**.** This is confirmed by the transcript of my discussion with Mackender.

QUESTION: "You say you told him that the system had a problem - - -

MACKENDER: A potential problem.

QUESTION: - - - at Prospect.

MACKENDER: At Prospect, yes.

QUESTION: And you gave him to understand that that could affect the whole of the system.

MACKENDER: Yes. Yes, yes, that's true. Speculation is what I was told that was.

QUESTION: Sorry?

MACKENDER: His comment was that that was speculation.

QUESTION: He said that's speculation.

MACKENDER: That's right, yes.

QUESTION: What did you say?

MACKENDER: I said, "That's my best technical assessment of what could happen."

QUESTION: Was there a disagreement between you and Mr Hill?

MACKENDER: Very hard to - no, I don't think there was a disagreement. I think he listened to what I had to say and took the bits that he wanted to hear and made a decision. Now, he may have put less weight - he may have put less weight on my "speculation" and more weight on the part where we had numbers but that was the way he makes - maybe that's the way he makes a decision. He didn't say to me, he didn't try and convince me - - -

QUESTION: No.

MACKENDER: - - - that this was an action he should take or that that was an action he should take. He was collecting information off me and putting weight on it based on whether he believed me or he didn't believe me or whether he thought I was technically competent or incompetent.

QUESTION: Did he communicate his decision to you - - -

MACKENDER: No."

After this discussion Mackender says that Hill and Pollett left, Hill saying:

HILL: **"**I feel like a cup of tea. We'll go and have a cup of tea Chris".

They then left the room.

The impression I have is that Hill and Pollett left abruptly with others in the room being uncertain as to what would happen next.

By Mackender's account, no decision had been made as to the area of the alert before Hill and Pollett left the operations room.

Pollett's recollection

Pollett gives an account of these events. He says that, by the time Hill arrived, neither he nor the meeting had a concluded view about the extent to which there should be an alert. He said:

POLLETT: "My recollection – my recollection is that we were still talking about – I mean, it was early days. I mean, it's not very long. I mean, this is a rapid response to a situation to get everybody into the office. People were still coming in, coming and going. Phones were ringing, information was being collected, etc. etc.; so I certainly don't recollect the meeting, say, 'aha, it's that or something else'. Sure."

Pollett says that on entering the room Hill said:

HILL: "We need to consider this carefully – we don't want to cause undue alarm."

Pollett says Hill stated that opinion:

HILL: ` "very clearly, very strongly".

Hill's recollection

Hill's recollection of the events is quite different to that of the executives. He says that he spent only a short time, 5-10 minutes, in the Operations Room. He says that his first action,

HILL: "bearing in mind the bedlam I had observed on the 23rd floor"

was to say to Pollett,

HILL: "We should calm everybody down, tell them to have a cup of tea and send most of them home."

Pollett wisely did not take his advice.

Hill says that when he arrived in the Operations Room, Pollett said to him:

POLLETT: "We're trying to calculate what areas are at risk. We found positive results for both *Cryptosporidium* and *Giardia* at Potts Hill and Enfield. But we've also found some zero results in other areas. We've got to issue a

boil water alert but we have to calculate for what areas that alert should be issued."

Hill tells me:

HILL: "The advice I got then from Chris and subsequently was that they were trying to calculate on the basis of where they'd got positive results as distinct from negative results, what areas of Sydney could be at risk as distinct from those where there was no evidence that they were at risk and I concurred."

Hill also tells me:

HILL: "Given my lack of technical expertise, I could not make any useful contribution to the calculation which was being conducted."

He considered that the approach being followed by Pollett and his managers was proper and responsible.

HILL: "In my view it was not responsible to force people to boil water unnecessarily."

He says:

HILL: "they did try and explain it to me but I brought absolutely no skill to that, no qualifications for that. I didn't then, and I don't now understand where all the pipes run … I couldn't make that calculation and I couldn't even make a contribution to the calculation so I accepted their advice."

He says:

HILL: "They may have explained things to me but it was really immaterial to me."

He agrees that he did say that the matter was serious.

HILL: "I said "This will do irreparable damage to the company for a number of years … if it ever recovers. But that was, I think, prophetic, wasn't it?"

When asked whether he thought that his intervention may have influenced the situation, he said:

HILL: "I don't think in any way it would have influenced them in any improper way, no."

When asked about Prospect, he says:

HILL: "I have no recollection of anybody mentioning Prospect."

When asked whether they mention bypassing Prospect at any time, he says:

HILL: "That night, no."

When asked how it came about that he and Pollett left the meeting, he says:

HILL: "I had nothing to contribute to the exercise, the exercise was determining what parts of Sydney were at risk as distinct from those that weren't. So there was absolutely no point in me staying there and I was aware that I would contribute nothing. So at whatever point I left, it was at the point that I realised I could make no contribution to that process."

He was asked about the events:

QUESTION: "Right, but you wouldn't have said anything that might have led them to understand that you thought the right decision was to limit the area".

HILL: "I was of that view that on the basis of their advice to me that that's why they were on the 19th floor. They were trying to calculate – before I got there, they're trying to calculate, based on the distribution of the negative test results and the distribution of the positive test results, what part of Sydney should be put on a "boil water" alert. Their exercise. Their decision. I took advice on it. I was of the view that was the proper course to take but they had better get it right, they better do it quickly, and if I expressed that – I may have expressed that view to them. I was certainly of the view, then and now, that if they were persuaded that on the basis of the distribution of negative test results there were large sections of Sydney that were not at risk then it was a responsible course not to put them on a "boil water" alert. Now, I was of that view and I may well have expressed that view".

On leaving the Operations Room, Hill and Pollett went to the Boardroom. He was asked about these events.

QUESTION: "At your initial time in the boardroom when you first got there, as I understand what you're telling me, you didn't know of any decision having been made. It could have been Sydney-wide, it could have been ……."

HILL: "It could, yes. No, I'm sorry, no. When we went to the boardroom, I drew the box because I had been advised that not all of Sydney, and they were still trying to refine or define the areas, but I had been advised and I relied on the advice "not all of Sydney is at risk."

QUESTION: "Were you advised of that in the boardroom?"

HILL: "No. I was under the distinct impression that – that was the advice I got when I was still on the 19th floor, that it wasn't all of Sydney but they're trying to define or designate the areas at risk. "Designate" was a word that Chris used, but it was to define the area. But I was told when I went down to the 19th floor, not all of Sydney was at risk. It was a question of how much was and how much we would have to issue the alert. So they hadn't provided the boundaries. They were still trying to calculate the boundaries of the affected area. But I was clear in my – that's the advice I took when I went back to the 23rd floor and started drafting this"'.

Reid calls Pollett for an update

Pollett says he was called out of the discussions in the Operations Room to answer a call from Reid, who inquired as to the source and cause of the contamination. When interviewed, Pollett says he told Reid:

POLLETT: "Well, it could be this, and it could be this, and it could be this, all the way down the system. You know, it could be some stuff being washed out of a catchment. It could be something washed into a canal. It could be the operation of the [Prospect] plant. It could be sediments in Potts Hill reservoir because I have known a year ago we had had sediments, samples taken in Potts Hill and received some levels. I was still worried about biofilm because the flushing experience in the eastern CBD?"

His written statement also confirms that Prospect may have been the source of the problem.

POLLETT: "I informed him that the causes were not known at that stage but mentioned some possibilities to him including naturally occurring *Giardia* and *Cryptosporidium* in the catchments and raw water, the operations of the Prospect plant, and ingress of *Giardia* rich water into storage canals, sediments in the Potts Hill Reservoir, ingress of surface water or other objects into Potts Hill Reservoir, or other reservoirs, and bioflims in the pipelines. I informed him that we were still assessing the data and discussing the areas which could be affected."

It is plain that, even if there had been a misunderstanding about the earlier conversation, after this conversation Reid was entitled to believe that the alert should be for the whole Prospect system. At this point it was imperative that a revised health warning should be released and, as the Prospect plant was a possible source of contamination, appropriate action for public health required that a warning be issued for the whole Prospect system.

Pollett says he made the decision

Pollett says that, on leaving the Operations Room, he had not resolved the area that might be affected by a health warning. He says:

POLLETT: "I was still considering it in my mind. It would probably be fair to say that I had formed the view that we only had data from Potts Hill downwards because we talked about Potts Hill, Enfield, city tunnel. I remember asking questions: 'Do we have any other data?' There were people saying: 'Yes, we have some recent data that shows zero."

He says that he was aware of the reading in the sediment at Prospect plant but understood the tank was offline.

He acknowledges that the envelope of possibilities certainly included Prospect. He further says that when leaving the meeting he was:

POLLETT: "forming an opinion in my mind that given the – particularly the views that we shouldn't – and I think it's mentioned here. David certainly put the view that we should go - I'm not sure what words I have used, but it was something like 'the minimum area that could be demonstrated based on the facts."

Pollett's view of the impact of Hill's presence in the room was stated to be that Sydney Water should be cautious and not alarmist. He tells me:

POLLETT: "If we had data that showed a certain area, we should use that, reach conclusions on those data but the other thing that was going through my mind, as he was talking about not being alarmist by declaring areas that couldn't be clearly supported was the fact that my experience in the water industry, particularly in the UK with boil water notices, where they have quite a bit more than we do, the view there is that you do need to be cautious and they have evidence, they told me, that you can get quite a lot of injuries from boiling water, particularly with old people and young people and, you know, you need to be cautious about not overdoing it."

Pollett says he heard Hill's comment that the alert could damage the corporation, although he denies that his thinking was influenced by that. He says that he realised that Hill had the clear view that:

POLLETT: "we shouldn't be alarmist and should go with the area that we could justify on the data".

Pollett says that, if further information had come through the following day, which suggested a wider area might be affected, then the opportunity to extend the alert would be available.

POLLETT: "I wasn't particularly concerned about an all or nothing type decision. I knew that as we had more information it would be quite prudent and diligent the following day to say, "All right, well, we'll add some more."

Pollett denies he allowed Hill to make the decision.

POLLETT: "In my mind he was clearly leaving the decision to me, the ultimate decision on the area to me."

He says:

POLLETT: "it never occurred to me to leave it to the Chairman to make a decision."

Pollett gave me a written statement after he had an opportunity to reflect on the matter and before any issue as to effective management of the crisis had been discussed with him by the Inquiry. It gives a different emphasis to the role of Hill.

In paragraph 23 of his written statement, Pollett says that when he and Hill went to the Boardroom, the following was said:

HILL: "The precautionary notice should cover only affected areas which can be supported by facts and data. To go wider would be reckless and cause unnecessary alarm. Also it should only refer to *Giardia* because of Health's media release to the Sydney Morning Herald on 28 July". (This mean that any reference to *Cryptosporidium* – the potentially more dangerous organism, would be deleted.)

POLLETT: "As we discussed downstairs with our experts, it appears that on the information received and the sample data now available there are recent clear results in water from the Prospect plant as well as other areas being fed by the plant.

On the present data, the area affected is the Potts Hill system."

When interviewed Pollett gave further explanation of these events.

QUESTION: When I look at paragraph 23 of your statement ……

POLLETT: Yes

QUESTION: ….. am I to understand that it was after that conversation that you made the decision?

POLLETT: Well, that was the point at which – I mean, that's when we were sitting down to draft the release and I suppose what I'm saying here is that's, that's the point. I mean, having been through the thoughts that I have just described I had clearly formed a view in my mind that the Potts Hill area was the right …….

QUESTION: Was that when you communicated your decision to Hill? That seems to be."

POLLETT: Yes, that's, that's what I recollect.

It has been submitted to me that the remarks which Pollett attributes to Hill in his statement should be understood as policy advice. Bearing in mind Hill's earlier apparent dismissal of information relating to Prospect as theories or speculation, I doubt that his advice could be construed as policy. Although Pollett may have made the actual decision, Hill defined its parameters. There would be few Managing Directors who would make a decision which the Chairman described as reckless.

Morris' recollection of the decision

Morris' account is important. He says that, a short time after Hill and Pollett left the Operations Room, he also went to the 23rd floor. He was called into the Boardroom where Hill was altering the draft of the media release, which Metcalfe had previously prepared. He says he was asked "help us with the wording on this we have decided to go with the Potts Hill system".

Being unsure as to how the Potts Hill system should be described, Morris went back to the Control Room to discuss with the other executives the precise form of wording which should be used.

NSW Health issues a media release

After Hill and Pollett had gone to the Boardroom, they were interrupted and told that NSW Health had already issued Sydney Water's draft media release giving a Sydney wide alert. Armistead had done this on Reid's instructions but without Sydney Water's knowledge. It was read on the late evening news.

Hill was "appalled", being of the view that unilateral action by NSW Health was the "height of irresponsibility". Hill asked that Armistead be contacted by telephone and asked to retract the media release.

Metcalfe made contact and Hill took the phone. Hill's account of the conversation is as follows:

HILL: I said in the telephone "This is irresponsible. It's unauthorised and inaccurate." Armistead said "You people should have put the release out earlier. That's why we put it out." I said "You're in enough shit already. Don't argue. Just retract the bloody thing and get Mick Reid to ring me". Then I hung up".

Armistead gives a different account of the conversation. She says, at various stages, Hill "shouted", "yelled" and "screamed", "adopted a threatening tone" and "berated her personally". Hill denies this and says Armistead was "argumentative" and "belligerent in tone".

It was obviously a heated exchange. However, I am satisfied that Hill did not say "I will sack you" although he accepts he may have said words to the effect "you'll be sacked". He certainly said to those in his media office "she should be sacked".

I am satisfied that Armistead acted on the express instructions of her Director-General. Hill's actions did not enhance the prospects of effective communication between the two bodies then or in any future crisis.

The media release is "killed"

After finishing his conversation with Armistead, Hill asked Metcalfe to "kill" the release as quickly as possible, because it was alarmist and inaccurate.

Metcalfe immediately contacted AAP as the prime source of radio and newspapers for the evening. He spoke to the news editor who he told to "kill the story" stating "that it was inaccurate and wrong."

The effect of the attempt by Hill and Pollett to "kill" the media release was to cause confusion and undermine public confidence. This became obvious from the media response the following morning.

Hill speaks to Reid

At about 11:40 pm, Reid rang Pollett. Pollett told Reid that Sydney Water had asked for the retraction of the media release and that a modified release had been prepared and issued. He also expressed concern at the lack of consultation with Sydney Water before Armistead had released the draft media statement.

Hill then spoke to Reid and tells me he said:

HILL: "The Department has behaved with the ultimate irresponsibility. Your people, without authority, have released information on a serious issue that is inaccurate."

I understand that Reid was not aware that he was speaking to the Chair of Sydney Water, made a curt reply and terminated the call.

The media release is issued

Hill and Pollett sat together to redraft the media release. A copy of the draft is at Appendix I4, showing Hill's annotations. Hill took out the reference to *Cryptosporidium* in the draft because of his understanding of a statement issued by NSW Health on 28 July, part of which had been quoted. This had the consequence that the most potentially dangerous organism was not referred to in the release issued by Sydney Water that evening. NSW Health later approved this revised release. Whatever may be the medical debate about the effects of *Cryptosporidium*, it was in my opinion inappropriate to delete reference to it from the release.

Sydney Water issued the revised release at 11:40 pm. It is at Appendix I5. Later in the evening Pollett phoned Reid to assure him of future cooperation. Pollett also phoned his Minister to inform him of the latest actions.

Thursday 30 July

The Minister becomes involved

Minister Knowles assumed a major role in managing the incident from the morning of Thursday 30 July. This report explains some of the difficulties he faced.

The Minister's involvement until this point had been limited. He was first advised of the contamination findings in the Eastern CBD by Pollett at 2:00 pm on Monday 27 July. At that time, he was advised the cause was unknown but could be the result of earthworks relating to the Eastern Distributor.

On the evening of Wednesday 29 July he received advice from Pollett that the contamination was much wider spread than initially thought, that the area of concern had been determined and a media release issued. He was not told of the difficulties between NSW Health and Sydney Water.

On the Thursday morning, the Sydney media gave prominent coverage to the situation. Not surprisingly they highlighted the confusion in the message. The media coverage emphasised the differences between the alert issued by NSW Health read over the late news and the later release from Sydney Water. It was suggested that the handling of the matter was a "shambles".

At 8:45am on Thursday 30 July, the Minister spoke to the Premier and agreed that an Inquiry should be held into how the contamination occurred and notification and management of the issue. The Premier announced the Inquiry later that day.

Early actions announced

As the media attention to the issue continued, the Minister directed his staff to draft a media release and organise a media conference for the afternoon. Its purpose was to explain the actions which were being taken in response to the levels detected. Both were essential if the incident was to receive a proper perspective without causing unnecessary alarm. At this point, Sydney Water was telling the Minister that the possible source of the contamination was water from the Upper Canal to the Prospect plant. The canal was to be closed and chlorine levels increased.

The Minister assumes responsibility

Around 4:30pm, Minister Knowles met with the Premier, the Minister for Health and officials of NSW Health and Sydney Water. Pollett advised the meeting that the likely source of the contamination was either at or before the Prospect plant - possibly rainstorm contamination from the Upper Canal or backwashing of filters at the plant. He advanced the "slug" theory for contamination whereby intermittent pulses of contaminated water had been released into the Sydney distribution system accounting for high levels on one occasion followed by low levels on subsequent occasions.

On hearing this, Reid recommended that the alert be extended forthwith to the Prospect system.

The recommendation was accepted by the Premier and the Ministers at the meeting.

The Premier then questioned what Sydney Water was going to do about the problem. I am told that Pollett stated that the water supply was now bypassing the Prospect plant. He said the Upper Canal (from the Upper Nepean dams to the plant) had been shut off and water for Sydney was being drawn and chlorinated only from Warragamba.

A media release was drafted at the meeting extending the boil water alert to all Sydney residents served by Prospect. The words chosen were based on Pollett's advice. It stated:

"The Managing Director of Sydney Water, Mr Chris Pollett said tonight the outlet at the Prospect Water Treatment Plant has been shut off and water for Sydney was being drawn and disinfected from Warragamba Dam so that the water to Sydney will completely bypass the Prospect Water Filtration Plant."

The release also referred to positive findings for both *Cryptosporidium* and *Giardia.*

This media release was wrong. The Prospect plant was not then, and has never been, bypassed.

During the meeting, high positive results from samples taken at Palm Beach the night before (365C/151G) were phoned through to Pollett. He advised the rest of the meeting. These results confirmed the understanding, at this stage, that the problem was across the Prospect system.

Sydney Water issued the media release drafted at that meeting at about 7:00 pm that evening. Minister Knowles also issued a similar release. The documents are at Appendices I6 and I7. The fact that the bypass was not carried out was not corrected until a further "clarifying" media release at 6:00 pm the following day being Friday 31 July.

Friday 31 July

Misinformation by Sydney Water

In the late morning Minister Knowles announced the establishment of an Expert Panel to advise on the future quality of the water supply. The panel comprises experts in infectious diseases and microbiology as outlined at Appendix J. It became responsible for reviewing all test results as they became available and defining the criteria by which to decide when it was safe to drink Sydney water. The Minister also described the extensive testing being undertaken.

The media continued to maintain intense interest in the event. Pollett gave an interview to the ABC at 8:40 am in which he repeated the suggestion that the Prospect plant was being bypassed.

During the morning Minister Knowles became aware that the Prospect plant was still operating and had not been bypassed. Initially this information came to him from AWS (the operator of the plant) through the Premier's Department. This was contrary to the advice he had received from Sydney Water the previous day. The Minister met later with Pollett and Sydney Water executives who confirmed that the plant was still operating.

Sydney Water explained that there had been operational difficulties in effecting a bypass and, when early morning samples taken at the outlet of the plant showed zero levels *Cryptosporidium* and *Giardia*, it was decided that it was not necessary to close down the plant. Sydney Water believed that the measures to close down the Upper Canal and isolate the Prospect plant were sufficient to prevent any further contamination entering the system.

Pollett has submitted to me that the media release of 30 July was accurate because it spoke of future events and the "media release does not mislead the public into believing steps had been taken". This submission is contrary to the claim in the release that the outlet has been "shut off" and must be rejected.

Pollett told me that he recalls speaking to the Minister early in the morning of 31 July and told him there had been a delay in completing the bypass but that it should be completed by mid morning. The Minister does not recall such a conversation and, as Pollett continued to tell the media that the Prospect plant was bypassed, it is impossible to accept Pollett's recollection.

The "clarifying" media release was issued by Sydney Water at 6:00 pm that evening, indicating that while a clear water tank had been isolated, the plant was continuing operations. The media statement says that Pollett stressed that the contamination did not originate within the plant, but most likely came from the Upper Canal.

The media release of 30 July was intended to allay public concern but was inaccurate. The failure to provide prompt and accurate advice to the Minister was a serious breach of trust. The Minister and the public were entitled to expect greater accuracy in the advice from Sydney Water.

Saturday 1 August

Process of lifting alert is agreed

Around 10:30 am the Minister met with Sydney Water to discuss the testing regime and timing of results giving the "all clear" to various areas. There was confusion over whether fluoride could be used as a marker to assist in identifying whether the system had clean water.

At midday the Minister met with the Expert Panel and agreed a process to be followed for testing and clearing the system. In a subsequent media conference, the Minister estimated that an all clear for all parts of the system might take 6-8 days. The Minister tells me that he spoke to the Director-General NSW Health that evening about test results and areas proposed for release.

Sunday 2 August

The Expert Panel agreed to authorise Sutherland Shire to be announced as clear because it was no longer getting water from Prospect. The Minister announced the decision at 3:30 pm.

Sydney Water identified the additional post code areas to be released from the boil water alert and sent these to Minister Knowles' Office around 9:00 pm that night. The Minister sought confirmation from the Director-General of NSW Health who

advised that the all clear could be given for the identified areas at 9:00 am the next morning.

Monday 3 August

The Minister issued an early morning media release stating that another 50 suburbs were cleared from 9:00 am. At 1:30 pm the Minister met with the Premier and Sydney Water and NSW Health officials for an update on the testing and procedure for the rest of Sydney. At 3:30 pm the Minister announced that a large area of western Sydney was cleared.

Tuesday 4 August

The Minister issued a media release announcing the all clear for Sydney and removal of the boil water notice.

Some Conclusions

Poor communication in the decision making

The events of the evening of 29 July reveal a number of deficiencies in the procedures and management processes that were then in place. Communications between NSW Health and Sydney Water were at the least poor and later in the evening deteriorated significantly. This is probably due to a failure to have identified an appropriate procedure in advance which vested authority in an appropriately qualified person to take responsibility for the issue of a health warning. A process that contemplated the settlement of a media release between public relations officials without further input from persons skilled in public health matters was entirely inappropriate. It is apparent from the material before me that if NSW Health had the responsibility for the decision, faced with the uncertainty that existed within Sydney Water, they would not have hesitated to issue a Sydney wide alert.

The process by which the public was advised of the extent of health problems revealed significant flaws. The endorsement by NSW Health of a media release that did not refer to *Cryptosporidium* was inappropriate.

The actions of NSW Health

I have referred earlier to the delays which affected the issue by Sydney Water of the media releases on Monday 27 July and the of Wednesday 29 July. On each occasion there was a delay of some hours between the agreement with NSW Health that a release should be issued and its release. Reid was aware of these delays and had been concerned about them.

When Armistead became aware that it appeared that Sydney Water had not been able to act to put out a release in time for the late evening news, Armistead phoned Reid. She informed him that Sydney Water had not issued the release. As a consequence, the warning would not have been available to many people until the following morning. She was concerned.

Reid directed Armistead to do what she could to ensure that the release was issued immediately to the widest possible coverage. Sydney Water, Hill and Pollett do not believe that this was appropriate action by Reid. For my own part, but for one matter I believe Reid's action was appropriate.

In my opinion, once it had been determined that an alert should be issued, it should have been published without delay. I believe Reid was entitled to have little confidence in Sydney Water's capacity to do this. However, because Reid was directing that action be taken which was clearly in breach of the agreement he had with Sydney Water, in my opinion he should have ensured that Sydney Water was made aware of the situation. This may have assisted a more measured response from Sydney Water and avoided a confused message being given to the media and the public.

The correct decision?

I am also satisfied that, from the material available by 7:30 on the evening in question, the interests of public health favoured a decision to issue an alert for the whole of the Prospect system. In the previous week, there had been contamination in the CBD which is part of the Prospect system with high and extremely high levels of *Cryptosporidium* and *Giardia*. Once the high levels were found in the Potts Hill reservoir, it was obvious that previous theories of localised contamination were no longer tenable. I accept that it was possible that, having regard to the open nature of the Potts Hill reservoir, contamination could enter the system at that point even though no source had been identified. But there had been measurement of levels of contaminant in the sediment at the Prospect plant, which were assumed to be very high levels. This presented an obvious source of contamination. It was also known that the operation of the plant would have the potential to release water from the clear water tanks in pulses. This could explain the initial event, followed by clear readings and subsequent contamination of the system. It was also apparent that, because of the configuration of the system, contamination from the Prospect plant would be likely to be identified earliest in the city, and later only in the further reaches. Although it may have been possible to isolate the clear water tanks in the plant, this would not deal with the water which had already been released to the system.

In these circumstances, and particularly having regard to the high readings which had been previously measured and the complete uncertainty as to the cause, in my opinion the decision which

reflected appropriate concern for public health required that an alert be issued for the whole of the Prospect system. I accept the need for concern about unnecessary alarm and the risks to people when boiling water. However, the information that was available suggested that the level of contamination could be life threatening to immune deficient people, and warranted immediate action. The decision by Sydney Water to limit the alert appears to have been influenced by concerns as to the reputation of the Corporation.

The effect of Sydney Water's decision, followed by the attempt to "kill" NSW Health's media release, was to cause confusion and delay in the issue of a confirmed warning for the whole of the Prospect system. Agreement to issue that warning was only given after the intervention of the Premier and other Ministers the following day.

Management of the event

The MoU

The recent events were the first test of the adequacy of the communication arrangements detailed in the MoU. It is clear that it did not deliver effective communications between NSW Health and Sydney Water. The value of this instrument in its current form must be doubted.

In accordance with the MoU, once the contamination incident had been identified by Sydney Water on 21 July 1998, NSW Health was notified. Notification continued throughout the incident until difficulties emerged on the evening of Wednesday 29 July. During that evening the MoU failed and there was no effective framework for decision making to guide the actions of NSW Health and Sydney Water.

At the time of the incident there was no protocol in place, either in NSW, or in most developed countries, for the issue of a boiled water notice. Apparently medical experts, regulators and the community have different opinions on the appropriate timing for the release of such notices.

The MoU contains a general definition of a "contaminant incident". I am told that a detailed definition is still under consideration and requires further discussion between Sydney Water and NSW Health.

I have been told that both parties have previously resisted a detailed or prescriptive definition in the belief that it may prove counterproductive because "contaminant incidents" are generally difficult to predict or prescribe. They are considered to be low probability events although their consequences have a high impact. The agreed view prior to this event was that is best to allow some professional judgement of what constitutes a "contaminant incident".

As part of the deliberations of the Licence Regulator, the auditors have recommended that a clearer definition of a "contaminant incident" be developed. It was subsequently proposed that Sydney Water and NSW Health would refine procedures, undergo staff training and perform drills. Sydney Water's executive has endorsed this proposal.

I strongly support this proposal and will comment further on it in the Final Report.

Informing the public

In response to the First Interim Report the Government has requested the urgent development of national water quality guidelines that deal with *Cryptosporidium* and *Giardia* through the NH&MRC. The ongoing contamination in Sydney's water supply over the past week dictates that an interim protocol dealing with health alerts must be developed as a matter of urgency.

The community's understanding of the issue has also been heightened over the past weeks. It is critical that the community has the opportunity to develop an informed understanding of water quality issues and the risks to public health. Both *Cryptosporidium* and *Giardia* are commonly present in the natural water environment. An awareness is developing in the community that the presence of protozoa in the water supply at low levels will have minimal adverse health impacts and, without evidence of other systemic failures, is not a reason for alarm.

I support the development of a public education program which draws upon the available expertise. Some of the issues which need to be addressed are:

- *Cryptosporidium* and *Giardia* are commonly found in the environment, and humans are exposed to such organisms in the course of their everyday activities;
- there are more common methods of transmission of *Cryptosporidium* and *Giardia* than drinking water;
- a number of processes remove or reduce the level of micro-organisms in drinking water, such as catchment management, treatment and disinfection. However, these processes cannot remove all organisms, and drinking water is not sterile;
- the presence of *Cryptosporidium* and *Giardia* of itself may not involve a health risk – it depends upon the level whether they are alive or dead and, for *Cryptosporidium,* whether it is the species *C parvum*; and
- there are limits in the present scientific technique used for testing for *Cryptosporidium* and *Giardia*. It is difficult to determine whether they are alive or dead and the *Cryptosporidium* species.

The campaign must be carefully formulated. The message must be understood by all members of the public.

Public Confidence

It is essential that public confidence is maintained in the quality of Sydney's water supply. This can only be achieved:

- if information about water quality is published; and
- a transparent process for the issue of a health alert is determined.

Management by Sydney Water – the good and the bad

It is apparent that both NSW Health and Sydney Water were committed to the development of incident management procedures. However, although this commitment has been translated into words, the recent events demonstrated that it could not be successfully implemented.

A review of international best practice has confirmed that Sydney Water's corporate incident management policy is in line with the normal practice within major utilities. However, such policies are only useful if they are read, understood and applied.

As noted, the draft Interim Drinking Water Quality Incident Management Plan of Sydney Water in force at the time describes the measures to be adopted in the event of a significant or major incident. It states that "For best results, know the program and implement it quickly at all times. It is best to react than delay". These statements are sensible but were not followed by Sydney Water.

The draft Plan lists operational procedures that should be used in an attempt to eradicate contamination from the water supply. The documented response procedures were adhered to in the management of this incident. These included the rapid mobilisation of staff; shutdown of the Upper Canal, flushing, rezoning, reservoir dumping and disinfection procedures.

It is apparent that resources were quickly mobilised and within hours of the extension of warnings to the whole of the Prospect system, 200 network service staff were involved in flushing the system. Resources were also allocated to close and inspect the Upper Canal. These actions were well done.

Some actions were not implemented quickly, although this may in part be due to the fact that the Sydney Water does not own or operate the Prospect plant. The draft Plan states that comprehensive monitoring of the potential source of the contamination should be performed. In most (though not all) previous *Cryptosporidium* incidents around the world involving drinking water which have been reported, the source of contamination was the failure of the treatment plant. Sydney Water should have sampled more intensively at the Prospect plant, both for raw water and water entering the supply system as soon as the system was known to be contaminated. This may have enabled a more rapid identification of the fact that contamination was present throughout the distribution system.

In my opinion, Sydney Water was not prepared for an event of this magnitude. While the necessary incident management documents are in existence, they essentially constitute statements of policy commitments. In their current form they cannot and did not serve as an effective guide to the management of the event.

Management difficulties in both NSW Health and Sydney Water

There are some specific issues relating to the management of the recent events which require consideration. They are:

- The incident reporting chain in both NSW Health and Sydney Water appears to have failed to provide swift notification to an appropriate decision maker regarding the detection of very high levels of *Cryptosporidium* and *Giardia.* In my opinion, the levels detected on 25 and 26 July warranted immediate discussion between appropriate decision makers in both agencies to allow an informed assessment to be made. This did not occur.

A comprehensive Incident Plan must be developed.

- NSW Health does not currently possess the expertise necessary for a fully informed decision about the impact of a potential contaminant in the water supply system on the Sydney population. The department is dependent on Sydney Water to define the area at risk. Sydney Water is required to balance its commercial imperatives with broader public health concerns, which has the potential to compromise the decision. This is not appropriate.
- NSW Health has limited specific statutory powers in relation to the regulation of drinking water. It relies on the Memorandum of Understanding for its regulatory powers. The MoU provides no clear guidance as to who is to issue public health alerts or take rectification action in the event of a contamination incident. The lengthy delays experienced in the development of the MoU highlighted difficulties in identifying the role for a health regulator in addition to funding constraints on NSW Health in carrying out this function.
- The views of the technical and operational staff within Sydney Water who fully understood the operation of the system and the likely dispersion of any possible contaminants do not appear to have been adequately reflected in the decision on 29 July. This decision should have been made after consideration of the operation of the distribution system and the likely health consequences. The impact on the reputation of the Corporation should have been irrelevant.
- Contrary to the Draft Incident Management Plan, there appears to have been poor communication between Sydney

Water's operational team and its media team, despite the pivotal role of the latter in coming to an agreed position with NSW Health.

Sydney Water's role

Sydney Water is responsible for two distinct functions. The first is the "harvesting" of water. This entails management of catchment areas and storage dams. The second is the distribution of water to consumers. A view has been expressed by some that public confidence has been lost in Sydney Water's ability to effectively manage these competing demands and that catchment protection and broader environmental and health protection have been afforded a lower priority than community expectations dictate.

It is apparent that some of the problems revealed in this event indicate a lack of effective application of the current incident management systems. Others may arise from the Corporation's structure which requires it to give equal consideration to its business objectives, protection of the environment and the protection of public health. These objectives may not always be compatible.

These matters need further consideration to determine whether the current structure allows an appropriate balance to be achieved. Whether it is possible or desirable to continue to maintain a single organisational structure must be reviewed.

Communication with the public

It is my view that after 29 July, the operational levels of Sydney Water acted promptly to keep the community informed of the protective actions required, once communication difficulties between the two agencies regarding the scope of the potential health risk had been resolved.

The original difficulties derived from a lack of clarity in the responsibilities of NSW Health and Sydney Water.

Conflicting messages regarding the area affected by a boil water alert

The initial release of a Sydney wide boil alert by NSW Health and its subsequent retraction by Sydney Water to one based around the Potts Hill system undermined public confidence in the authorities charged with ensuring water quality.

Consumer surveys have shown that the community expects to be advised quickly, honestly and accurately about problems with drinking supplies when they occur.

Inaccurate information

Inaccurate information provided to the community by the media regarding the likely health impacts of *Cryptosporidium* was not corrected by NSW Health. This inaccurate reporting was subsequently used as a justification by Sydney Water to restrict the focus of health warnings to *Giardia*. NSW Health should have acted to ensure that publicity was given to its complete statement.

Delays in the release of the boil water alert

The split in responsibility for the public notification of a health alert resulted in undue delays in the issue of media releases.

Surveys indicate that consumers believe that Sydney Water should err on the side of caution: "let us know early to boil water – you can always say it was just precautionary if it is then found not to be necessary".

Conflicting public health information

Conflicting public health information regarding the appropriate time necessary to boil water (one or three minutes) was issued. The Sydney Water media release of 28 July recommends boiling water for three minutes. This was subsequently revised on 29 July to boil for one minute.

There should be one spokesperson rather than a number of people speaking on any issue. That person should have the authority for giving clear honest messages. Consumers seek precise instructions on what to do. During this event, instructions appeared to "build up" as the week went by.

In my opinion, NSW Health should be given the sole responsibility and accordingly accountability for releasing public health alerts.

Communication with Government and the Board

Communication between Sydney Water and the Government involves contact between the Board of Directors, the Minister for Urban Affairs and Planning as the holder of the Operating Licence, shareholding and regulating Ministers and finally the Parliament.

The Managing Director has a clear reporting responsibility to the Board.

Notification to the Minister of the occurrence of incidents is the responsibility of the Managing Director who is required to make a judgement as to the form of any advice.

Despite being aware of positive test results for *Cryptosporidium* and *Giardia* from 21 July 1998, neither the Board nor Minister Knowles were made aware of potential threats to the water supply system until Monday 27 July. Until that time, the Managing Director had taken the view that the incident was essentially an operational matter that did not require the Board or Minister to be informed.

By contrast the Director General of NSW Health first informed his the Minister on 24 July and thereafter provided regular updates.

Minister Knowles was not made aware of the interagency communication problems which had been encountered on the night of 29 July and which culminated in Sydney Water having to "kill" the media release that had been issued by NSW Health.

He was not made aware of the difficulty which would almost certainly lead to the media giving prominent attention to the confusion of the previous evening.

The media coverage focussed on the retraction and reissuing of a restricted boil alert area, characterised by criticisms of the "confusion" and the "conflicting reports". The handling of the matter was described as a "shambles" and at that time claims were made that the authorities involved had deliberately downplayed the potential problem. This loss of public credibility in Sydney Water made it necessary for the Government through the Premier and Minister Knowles to put aside the corporate management structure and adopt the primary management role in the handling of the crisis.

It became necessary for the Premier and the Minister to extend the boil water alert to all Sydney residents on the Prospect system on 30 July.

It is my view that the actions of the Government through the Premier and Minister Knowles in establishing an Expert Panel and Minister Knowles in accepting the responsibility of informing the public was essential. The incident was poorly managed by Sydney Water.

Advising the Minister about possible cause and remedial action

The Minister's capacity to effectively and accurately advise the public throughout the incident was seriously compromised by the inaccurate advice from Sydney Water.

In the media release of 30 July issued by Sydney Water entitled "Source of Contamination Confirmed", Pollett said that the outlet at the Prospect plant had been shut off and water was being drawn and disinfected from Warragamba Dam and it would bypass the Prospect plant. This advice was also provided to the Premier and the Minister. This advice was wrong.

It was the company operating the Prospect plant, Australian Water Services, who ultimately advised the Minister that it was still operating and had not been bypassed.

In the management of any crisis, the need to have consistent and reliable information introduced into the public arena is widely acknowledged.

It is my view that communications from the Managing Director to the Minister were poor in the lead up to the Sydney-wide boil water alert and during the period that the Minister had effectively assumed responsibility for managing public knowledge of the event. This served to further erode public confidence in the management of the event by Sydney Water.

It is possible that the reporting arrangements and accountabilities prescribed for Sydney Water under the *State Owned Corporations Act 1989*, added to the difficulties in communication between the Managing Director, the Board and the Government.

It is essential that the Government reviews the arrangements relating to corporate control to ensure that the Government has sufficient power to obtain information from the Corporation and, if circumstances require, give a direction to the Corporation which is necessary in the public interest.

Communication between Sydney Water and NSW Health

The MoU between Sydney Water and NSW Health took two years to complete. This suggests difficulties in agreeing appropriate principles to control the relationship between Sydney Water and its health regulator. This will to be reviewed in the final report.

Communication between Sydney Water and Australian Water Services

My enquiries to date reveal significant difficulty in the communications between Sydney Water and AWS. No doubt these derive from their competing commercial perspectives. However, an inability for free and effective communication between the operators of the different parts of a water supply system cannot be accepted.

I have presently identified a number of issues which require consideration in the Final Report. One of these issues is the apparent breakdown of communications between the company and Sydney Water as the crisis escalated. This is evidenced by a lack of effective exchange of information regarding the operation of the plant and of Sydney Water's data regarding the quality of the raw water entering the plant leading up to and during the event. This impeded the early development of a co-operative approach to the identification of the source of the contamination and the implementation of effective and timely remedial actions. The Inquiry has been able to play a significant role in bringing these parties together to work for joint solution to the problems.

Future Directions

This Report has focussed on the management of the event. However, the observations made and conclusions reached foreshadow a number of issues which must be addressed. Briefly, these are as follows:

Strengthening of public health powers and regulatory controls

The statutory powers of NSW Health may need to be strengthened in the following areas:

- to require tests and other quality assurance processes to be undertaken by water suppliers;
- to require water suppliers to disclose to NSW Health a range of information necessary for the proper evaluation of drinking water safety;
- to declare public health alerts in relation to drinking water supplied by any authority; and
- to consider whether NSW Health is appropriately resourced to accept a role as an effective regulator of water safety. The current capacity must be bolstered by the development of improved technical knowledge about the water distribution system for Sydney Water and other water authorities.

Also the role of the Licence Regulator should be reviewed having regard to the experience gained in this incident;

Public health alerts

- A committee of experts should be constituted to support NSW Health in its statutory role in respect of public health alerts.
- A public health education program should be developed which provides the community with an informed understanding of the health risks associated with various water quality indicators.
- The MoU between NSW Health and Sydney Water should be reviewed, particularly in relation to operational and communication difficulties highlighted during the recent event.

- The MoU should be supported by an interim protocol which identifies appropriate triggers required between Sydney Water and NSW Health to institute action in response to positive findings of *Cryptosporidium* and *Giardia* and the circumstances leading to boil water alerts and their subsequent lifting.
- An interim protocol must be completed by the time of my Final Report and should remain in place until such time as the NH&MRC finalises the development of national guidelines. The protocol should include a clearer definition of "contaminant incidents". It should recognise that the decision to make a health alert will not be based on a single test result alone, but on factors including the following:
- presence of faecal coliforms
- evidence of suspected source of contamination
- malfunctioning chlorinator / treatment failure
- evidence of human disease
- the persistence and reported occurrence of parasites
- the size and demographics of the potentially affected population
- raw water turbidity.

I expect that other relevant factors will be identified.

Water quality data

There should be greater coordination within Government of the collection of data on water quality for use by all relevant agencies. This should involve greater co-ordination in the roles of the primary regulators – the EPA and NSW Health and the Department of Land and Water Conservation, with the common interest of protecting the environment and protecting the health of the community.

Greater public transparency should be introduced in the reporting of water quality data to restore public confidence in Sydney Water. This should occur in conjunction with a public education program which provides an understanding of potential risks to public health

A system should be developed to provide on line access to test results for regulatory agencies.

Incident management

Contingency and emergency plans between NSW Health and Sydney Water should be finalised as a matter of urgency, including staff training and incident drills.

Water catchment protection

The current structure of Sydney Water should be reviewed to determine whether current environmental and health considerations are given sufficient priority and if not, determine the appropriate future structure.

Ministerial control over Sydney Water

The arrangements relating to the management of Sydney Water as a State owned corporation should be reviewed to ensure that the Minister has sufficient power to obtain information from the corporation and if circumstances require, give direction which is necessary in the public interest.

Update on Cause

In the First Interim Report I discussed the possible causes of the contamination event which led to a Sydney-wide health alert on 30 July. (I shall refer to this as the First Event.) Since that report, considerable further work has been undertaken. This work has been assisted by the presence in Australia of experts from Thames Water in England, CH2M Hill from the United States and others.

Do we have *Cryptosporidium* and *Giardia*?

Dr Jerry Ongerth is an engineer who has maintained an interest in *Cryptosporidium* and *Giardia* for a number of years. He was reported in the media of Saturday, 29 August casting doubt upon whether or not the laboratories had accurately identified *Cryptosporidium* and *Giardia* in Sydney's water or whether the organisms were algae. He had previously indicated to me that he had some doubts about the laboratory work. In order to authoritatively determine this issue, I arranged for all of the relevant microbiologists (including Dr Ongerth and representatives from Macquarie University, University of NSW, Northumbrian Water, UK, and Thames Water, UK) to meet on Sunday, 30 August and collectively examine some of the available samples.

As a result of this meeting, all of the experts agreed that there was "unequivocal presence of *Cryptosporidium* and *Giardia* in Sydney's treated water at concentrations that are of public health concern".

Accordingly I am satisfied that the recent health alerts have been appropriate having regard to the available evidence.

Cause of the First Event

In the First Interim Report I indicated that the contamination of the system may have been due to any one of three possible causes or a combination of those events. I identified the likelihood of the inflow of contamination from:

- sources within the catchment which may have passed through the Prospect plant and entered the distribution system;
- changes in the operation of the plant itself which may have allowed the introduction of *Cryptosporidium* and *Giardia* into the distribution network; and

- inflow of contaminated material immediately downstream of the treatment plant.

Considerable work has been undertaken in relation to each of these matters. I am now satisfied that it is unlikely that the contamination was significantly contributed to by the introduction of organisms into the network immediately downstream of the Prospect plant. Rigorous inspection has been carried out of the linkages between the pipes and Prospect Reservoir and the relevant distribution chambers. The pipes have not yet been internally inspected but I understand that divers will complete this task in the next few days. From the evidence which is now available, if this was a source of any contamination, it was limited and is unlikely to have caused the levels of contamination which were measured throughout the system.

Considerable work has also been done on investigation of the plant during the relevant period.

This work has not reached any conclusions beyond those which were discussed in the First Interim Report.

For the plant to have become contaminated, it is necessary for there to have been an inflow of organisms from within the catchment. Prior to the First Event, there was no identifiable rain event which would have caused run-off to bring faecal contamination in sufficient quantities within the catchment into the raw water stream. Accordingly, the contribution of the catchment is more likely to have come from the scouring of the Upper Canal, or some other unusual event apparently not associated with other faecal indicators. These are still under investigation.

The Second Event

Further significant contamination of the system was identified on 25 August (I shall refer to this as the Second Event.) By this time, because of the earlier events, the operation of the Prospect plant had been modified so as to achieve optimum performance. This was done by adjusting the hydraulic throughput of the plant and ensuring that the coagulation process was functioning effectively. Notwithstanding these measures, extremely high levels of organisms passed through it and were measured in the supply system immediately downstream, including one reading in the treatment plant laboratory. These facts suggest that the cause of at least the Second Event is likely to be the inflow of extremely high levels of organisms into the water which is held in Warragamba Dam. Since the First Event, the Prospect plant has

only been drawing from that dam, the Upper Canal which draws water from the Upper Nepean dams having been isolated. In the days preceding the second contamination event, the catchment experienced heavy rainfall and the Dam filled from approximately 60% to overflowing within a period of about ten days. Having regard to the previous drought conditions which had prevailed for many months, it is likely that significant faecal matter within the catchment would have been picked up and introduced into the Warragamba Dam.

I also understand that the introduction of water of this volume into the dam may have been likely to have scoured the settled matter at the bottom of the dam and caused it to enter into suspension. The consequence is that *Cryptosporidium* and *Giardia* particles which were lying on the floor of the dam, would now be available to enter the raw water supply to the Prospect plant.

I have been informed that, prior to the Second Event, the heavy rainfall caused sewage treatment plants at Goulburn, Bowral, Mittagong, Bundanoon and Berrima, which lie within the Wollondilly catchment which flows to Warragamba, to be overloaded. The Goulburn plant was unable to irrigate its treated effluent and this was released into the Wollondilly River. Sludge ponds at Bowral were flushed into the river and the Bowral, Mittagong, Bundanoon and Berrima plants were all required to operate at extraordinary levels. The consequence is that significant volumes of poorly treated sewage were released into the catchment and may have found its way to Warragamba dam. There is also evidence of the introduction of faecal material into the Cox's River. The Wollondilly and Cox's Rivers comprise in excess of 60% of the flow into Warragamba Dam.

Sampling of the dam water on Wednesday, 26 August revealed high levels of contamination in the dam water at various depths. Subsequent testing has given clear readings. I do not believe at this stage that this should be taken as evidence that the dam water is clear. I understand that it is possible that there are still high levels of contamination in certain parts of the dam. I have requested that efforts be concentrated on understanding the likely flows within the dam to determine whether the water and sediments which are contaminated can be identified and attempts made to isolate them from the raw water intake.

In the meantime, I have also requested that Sydney Water give immediate consideration to increasing the monitoring within the dam adjacent to the raw water take off. If this can be done, it should be possible to identify at an early stage whether the supply

system is taking contaminated water from the dam which will allow early identification of any future possible problems in the system.

I have also been informed that efforts are presently being made to flush the Upper Canal and bring supplies from the Upper Nepean dams back into the system. This would not have the capacity to provide for the whole of Sydney's daily need, as Warragamba may still have to provide approximately 50% of the water.

It will be necessary to maintain a rigorous monitoring and management regime. Further public health alerts may be necessary depending upon the capacity to control the quality of the raw water supply.

The second contamination event has assisted an understanding of the performance of the whole system. It is now apparent, although the reasons are presently unknown, that even when the Prospect plant is operating to its optimum levels, it is not able to remove all *Cryptosporidium* and *Giardia* particles which are introduced in the raw water supply. It was never designed to achieve total removal of these particles, but it was believed that it would take out a greater proportion than appears to have occurred during the Second Event. Accordingly, it is apparent that, if the catchment continues to introduce extremely high levels of these organisms at various times, with the present treatment processes, they must end up in some concentration within the distribution system.

As is well known, I have available to me expertise in various fields. Considerable effort is being made to reach conclusions. However, as I indicated in the First Interim Report, it may never be possible to identify the precise cause of these of events. The difficulties in analysing the First Event appear greater than the Second which is likely to have been caused by run-off of material finding its way to the Warragamba dam during the extraordinary rain events in August. The levels of organisms which this introduced were such that the current treatment processes could not entirely eliminate them before they entered the distribution system. It will be necessary to conduct further urgent investigations to confirm whether this is the cause and also to identify whether there is any element of the plant or its operations which could be modified to provide a higher quality water supply.

As I indicated in the First Interim Report, *Cryptosporidium* and *Giardia* will naturally exist in the catchment. Before the Prospect plant was commissioned *Giardia* was managed by chlorination of the water supply. This continues today and we can assume that the *Giardia* organisms which are detected should not be a health

problem. Before the Prospect plant was commissioned, *Cryptosporidium* would have passed from the catchment into the water supply at various times. It was believed that the Prospect plant would have operated to filter most of the *Cryptosporidium* out of the water supply. However, because of the recent events, it is necessary to reconsider this assumption. It will be the subject of consideration in my Final Report.

A Letters from Clayton Utz

CLAYTON UTZ

Our Reference: 158
Your Reference:

Partner/Solicitor Contact:
S Stuart Clark 9353 4158

14 August 1998

By Hand

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Dear Ms Kruk

SYDNEY WATER INQUIRY

We write further to our earlier letter today.

We are concerned that the Interim Report will be prepared and delivered in circumstances where:

1. We and our client are only aware of the identity of some of the witnesses who have appeared before Mr McClellan in the course of this Inquiry;

2. Neither we nor our client have been provided with access to the evidence of those who have appeared before you beyond that of the Sydney Water officers and some of the Department of Health officers. Indeed we have no way of knowing whether you have taken evidence from other Sydney Water officers or employees without our knowledge; and

3. We do not know the details, let alone have copies of, all the documentation that has apparently been delivered to you.

In these circumstances we have no way of responding to, or correcting, material which is wrong. Similarly, we have no way of making proper submissions to you to the evidence that should, or might appropriately be, made on the basis of the material before you prepare and deliver your Interim Report.

This is simply unfair to Sydney Water and its officers and employees who have been involved in this incident.

Accordingly, we ask you to deliver to us, as a matter of urgency, the following material:

1. A complete list of the witnesses who have appeared before Mr McClellan;

Ms R Kruk
Sydney Water Inquiry Secretariat

CLAYTON UTZ

14 August 1998

2. Copies of the transcripts or notes of evidence given by all those who have appeared before Mr McClellan; and

3. Copies of all documents or other material that has been provided to you in the course of the Inquiry.

We assume that, as further material comes to hand, this will be delivered to us on a timely basis.

Would you please advise our Mr Clark when this material will be available.

Yours faithfully
CLAYTON UTZ

Clayton Utz

S Stuart Clark
Partner

CLAYTON UTZ

Our Reference: 158
Your Reference:

Partner/Solicitor Contact:
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14 August 1998

By Hand

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Dear Ms Kruk

SYDNEY WATER INQUIRY

As you know we act for Sydney Water Corporation Limited ("**Sydney Water**") and its Board of Directors.

We are compelled to record our concerns in relation to aspects of the way in which the Inquiry is proceeding and seek your assistance in relation to the provision of documents in a timely manner. The specific instances were raised at the Inquiry yesterday by our Mr Clark. Unfortunately, only some of the matters raised by him were the subject of any record.

Our concern relates to our access, and that of our clients, to documents produced by, or transcripts made of the evidence given, by other witnesses.

The Inquiry demanded of our client's Managing Director, Mr Pollett, that he provide you with a statement touching upon certain events that occurred on the evening of 29 July 1998. That statement was produced after which Mr Pollett was questioned at length by Mr McClellan QC. Those questions and answers were recorded and, subsequently, transcribed.

Aspects of the evidence given by Mr Pollett were, apparently, of particular concern to Mr McClellan. Part of that evidence related to what appears to be, in the view of Mr McClellan, critical conversations with officers of the Department of Health (the "**DOH**").

While the evidence of Mr Pollett and other directors and officers of Sydney Water was collected, at the direction of Mr McClellan, with each person segregated, the evidence of the DOH officers was obtained with all of the officers involved apparently working together to prepare a written statement recording their collective version of the events. The document itself verifies this. When the officers of the DOH came before Mr McClellan to be questioned in relation to the matters dealt with in that joint statement they were allowed to appear together and, as a consequence, assist each other in their recollection of the key events.

Mr McClellan then adopted a procedure which he described as being intended to attempt to resolve differences between the version of the events provided by Mr Pollett and that provided

by the DOH officers. This was to be achieved by bringing Mr Pollett, Mr Reid (the Director General of Health) and Mr Andrew Wilson (the NSW Chief Health Officer) together and directing them to participate in a recorded question and answer session.

You will recall that we had been seeking access to the DOH statement of the events of the evening of 29 July which had been prepared by the DOH officers for some time. Our first request for that statement was made to you more than 24 hours before this joint meeting. It was refused. Similarly, requests made of the DOH for a copy of the document were refused. The document was not provided to us until ten minutes before the joint meeting commenced. Even then our Mr Clark had to make two separate requests for a complete copy of the document.

When the joint meeting commenced it emerged that the DOH officers had been provided with copies of both Mr Pollett's statement and the transcript of his questioning by Mr McClellan at 3.30 pm yesterday afternoon. As a consequence the two DOH officers had copies of the material (as did their lawyer) and they had clearly had an opportunity to review the material before coming before Mr McClellan. For our part we had been provided with a single copy of the document in circumstances where there was neither time nor the facilities to copy the document nor consider it in any detail.

During the course of the joint meeting reference was made by the DOH officers to certain mobile telephone records which they relied upon to establish the time and length of a crucial conversation. We had not been provided with copies of those documents. When our Mr Clark asked for access to those records he was told that they were attached to a statement. They were not attached to the document which we had been provided by the Inquiry.

After the meeting had concluded it emerged that the telephone records were attached to detailed statements recording the recollections of the DOH officers as to what had been said in the critical conversation which had been the focus of Mr McClellan's question and interest. While the DOH officers had been provided with full and timely access to all available material recording Mr Pollett's recollection of that conversation (and had copies of that material before them during the meeting) neither we nor Mr Pollett had been provided with copies of the documents recording the DOH officers' recollections (to which they referred during the course of the joint meeting). Indeed, we had not even been told that the documents existed. Rather, we and Mr Pollett had been provided with a chronology which purported, in less than a page, to summarise the relevant recollections of this critical conversation.

When our Mr Clark drew this to the attention of you and Mr McClellan he was told that it was of no consequence. Mr McClellan stated, as he has on a number of occasions, that the manner in which the Inquiry proceeded was a matter for him and that, in any event, this was not a matter of concern in relation to the meeting that had just taken place.

We accept without reservation that it is for Mr McClellan to decide how to conduct the Inquiry. However, we are certain he will agree that the Inquiry has to conform to the requirements of fairness. To treat people coming before the Inquiry otherwise than with equality is unfair.

While we are cognisant of the repeated statements by Mr McClellan that the Government of New South Wales is demanding of him that he provide an interim report by the coming Monday this cannot be allowed to prejudice the position of our clients in the sense that they are denied

natural justice.

It is our duty to make clear that, if as a product of what we submit is unfairness, the Interim Report is prejudicial to our clients or any of them we reserve the right to go to Court for appropriate relief.

We fully understand the Government's anxiety to obtain a report at the earliest possible time. The public interest demands no less. Sydney Water, as a corporate citizen and each of its Directors and employees as individuals, have been anxious and remain anxious to provide their full co-operation to the Inquiry.

However, there is another public interest to be borne in mind. That is the public interest in fairness. Consistently with the need for speed, absence of formality, a worthwhile report by the Inquiry has to be the product of a fair procedure.

Accordingly, we seek your assurance, in writing, that we, and our clients, will be provided with full access to documents (be they statements, transcripts or other material) to which reference will be made or upon which reliance will be made by others, together with sufficient time to consider their contents before being required to submit to further questioning.

We shall be grateful if you would provide this assurance at your earliest convenience.

Yours faithfully
CLAYTON UTZ

S Stuart Clark
Partner

B Replies from the Sydney Water Inquiry

Sydney Water Inquiry Secretariat

Chief Secretary's Building
121 Macquarie St
Sydney NSW 2000
Tel: 9228 5586 Fax: 9241 5434

14 August 1998

By Fax 9251 7832

Mr S Stuart Clark
Partner
Clayton Utz
SYDNEY NSW 2000

Dear Mr Clark

I refer to your letter of 14 August 1998 hand delivered at 6 pm that day.

Earlier today I made you aware that the Interim Report which is to be delivered to Government on Monday 21 August would be confined to a discussion of the possible causes of the contamination of the Sydney Water Supply. I also indicated to you that the Interim Report with a discussion of the management of the incident would probably not be delivered to Government until at least Friday, 21 August 1997. I confirm that this is the position.

Accordingly, I wrote to you earlier today and gave you an assurance that the Inquiry would not provide an Interim Report without providing your clients with an appropriate opportunity to make submissions.

As you know, I made arrangements for your clients to discuss with Mr McClellan at 6 pm today the material which is presently with the Inquiry which discussed the possible causes of contamination. Because of a further incident of contamination in the water supply you requested a deferment of that meeting, to which Mr McClellan agreed. It is still necessary for the Inquiry to discuss with your clients the present state of available information in relation to the cause of the contamination and would wish to do this so that any matters upon which your clients can provide assistance can be considered and, if appropriate, incorporated in the Interim Report.

Because the Interim Report in relation to causation must be with the Government on Monday, I would appreciate you contacting me urgently to make arrangements for the necessary discussions with Mr McClellan at the earliest opportunity.

Yours faithfully

Robyn Kruk
Head of Secretariat

Sydney Water Inquiry Secretariat

Chief Secretary's Building
121 Macquarie St
Sydney NSW 2000
Tel: 9228 5586 Fax: 9241 5434

14 August 1998

By Fax 9251 7832

Mr S Stuart Clark
Partner
Clayton Utz
No. 1 O'Connell Street
SYDNEY NSW 2000

Dear Mr Clark

SYDNEY WATER INQUIRY

I refer to your letter of 14 August wherein you raise concern regarding the provision of documentation from the Inquiry.

I confirm that the following documents were provided to the Sydney Water Corporation through Ms Josephine Hyman of your office:

2pm, on Thursday 13 August 1998 – Ms Josephine Hyman (CU Solicitor)

- Statement of Mr Chris Pollett, Wednesday 12 August 1998 (5 copies);
- Record of Interview with Chris Pollett, Wednesday 12 August 1998 (5 copies);
- Record of Interview with Geoff Morris, Wednesday 12 August 1998 (5 copies);
- Record of Interview with Jeff McCarthy, Wednesday 12 August 1998 (5 copies);
- Mr Reid's opening statement to the Inquiry, Friday 7 August 1998 (5 copies);
- Health's meeting with the Inquiry on Wednesday 21 August 1998 (5 copies);
- Health's record of Mr Reid's meeting with Col Gellatly dated 30 July 1998 (5 copies).

Supplementary documentation was provided prior to the discussion between officers from the Health Department and Sydney Water Corporation on Wednesday 17 August 1998 which included minor amendments made by the Health Department to its agreed chronology of events. A full copy of the chronology was also provided.

As you are aware, the discussions of Wednesday, 12 August 1998 were conducted to allow the relevant individuals to discuss matters on which there was a potential for divergence of views in relation to events of 29 July 1998. These issues had previously been discussed directly between the respective agencies and areas of potential disagreement identified by them. All of the persons involved in the discussions were aware of the issues which required consideration for at least two days prior to the meeting. The issues fall within a narrow area and depend almost entirely on the recollections of the individuals involved.

At the meeting you will recall that Mr McClellan offered to defer the discussion in light of the concerns you expressed about the recent receipt of some documents. You declined this offer on the apparent advice of your client and agreed to the discussion continuing.

As you are aware, Mr TEF Hughes QC appeared before Mr McClellan earlier in the day and made two applications. He asked that Mr McClellan seek from Government an extension of time for the interim report to enable a slower pace for the Inquiry. He also asked that Mr McClellan seek the power of a Royal Commission. After discussion with Mr McClellan and a break to enable Mr Hughes to receive further instructions, both applications were withdrawn. In these circumstances your client appears to have accepted the legitimate need for the Inquiry to proceed with expedition to enable it to meet the Government's requested timetable.

I am asked to assure you that Mr McClellan will provide your clients with a further opportunity to make submissions in relation to matters about which there could be any controversy and in particular in relation to any possible adverse findings.

Yours faithfully

Robyn Kruk
Head of Secretariat

C Terms of Reference

REVIEW THE PROCEDURES AND ACTIONS TAKEN BY SYDNEY WATER AND THE HEALTH DEPARTMENT

The New South Wales Government has commissioned an independent review of the procedures and actions taken by Sydney Water and the Health Department following the outbreak of Cryptosporidium and the micro-organism Giardia in Sydney's water supply.

The review will provide an initial interim report into the possible cause of the contamination and procedures in alerting the public.

Terms of Reference:

i) determine when the contamination occurred and when it was discovered by Sydney Water;
ii) identify the source of the contamination;
iii) identify any equipment, systems or management failures that may have led to the contamination;
iv) determine whether Sydney Water's monitoring and disinfection systems are adequate;
v) determine whether the current arrangements for water treatment are appropriate;
vi) determine who is responsible for the current arrangements and whether their actions were appropriate;
vii) determine whether Sydney Water and the Department of Health acted as swiftly as possible to inform the Government and the community of the contamination;
viii) determine whether communication between Sydney Water and the Department of Health on the issues was effective;
ix) recommend any changes or improvements to the procedures for monitoring water quality and informing the Government and the community of any problems in Sydney's water supply;
x) report on any other relevant matters including the accountability of Sydney Water to the Government and the community.

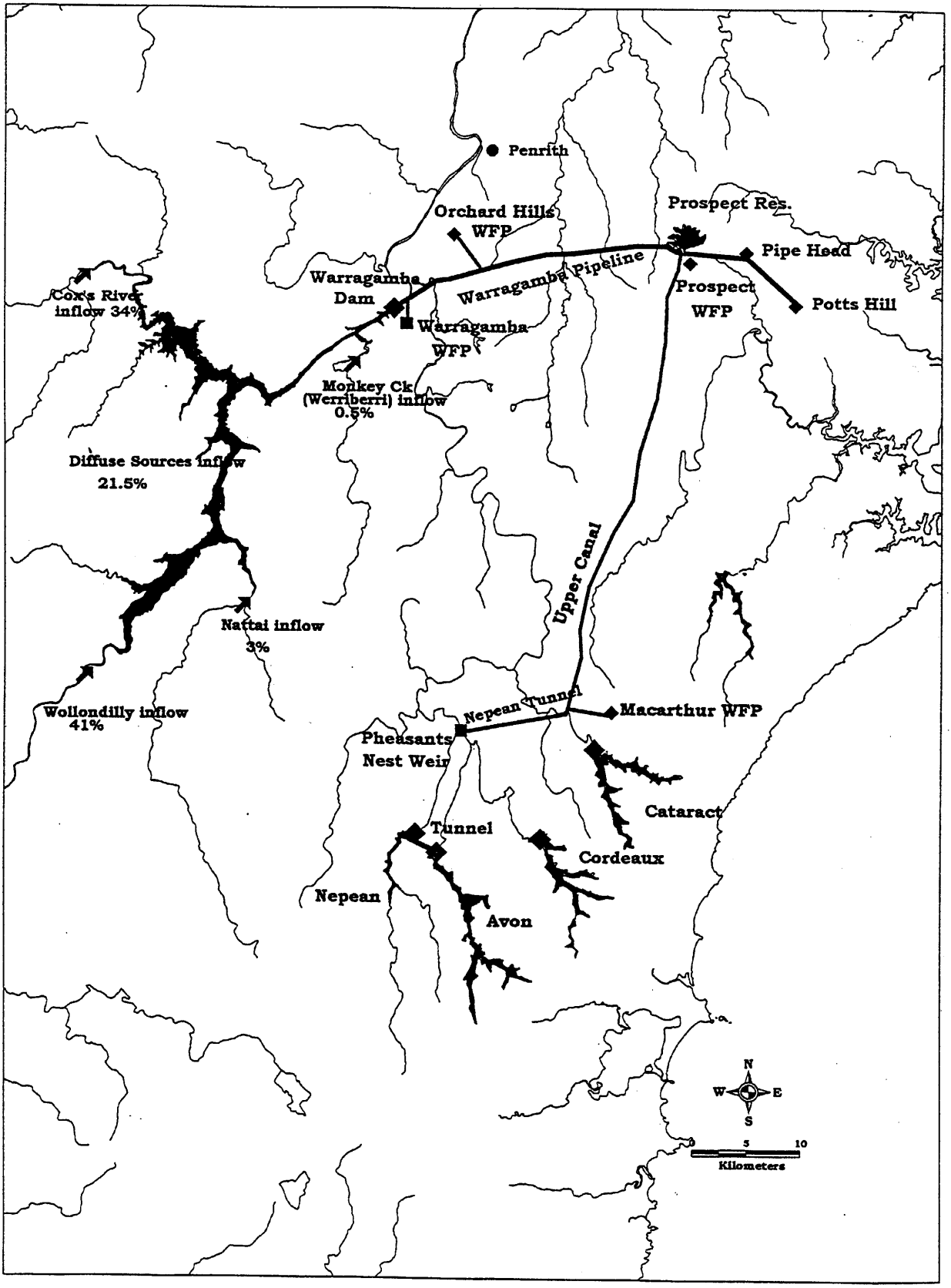
Submissions are invited from interested community members and organisations:

Sydney Water Inquiry Secretariat
121 Macquarie Street
Sydney NSW 2000

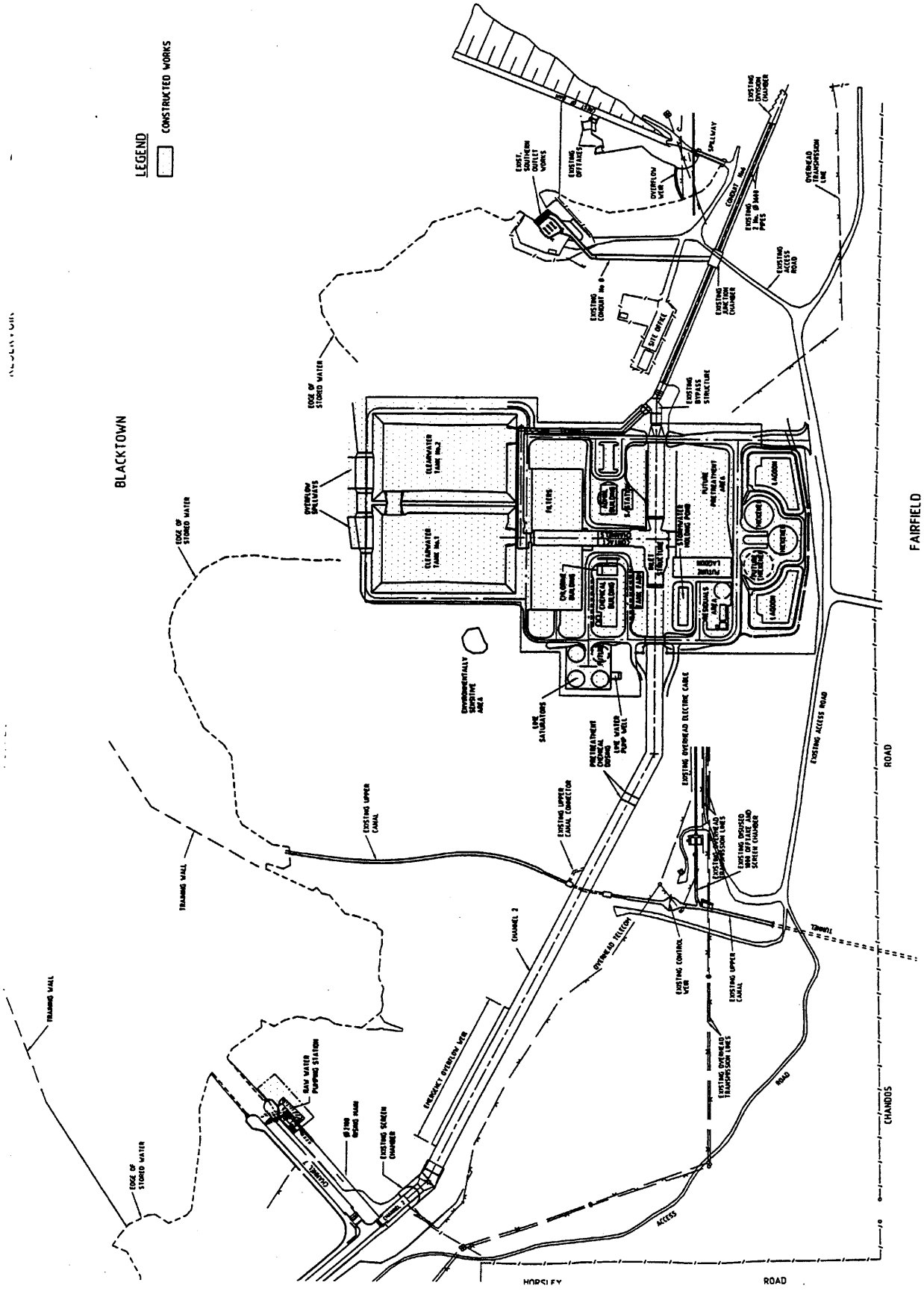
Telephone: (02) 9228 5586

Submissions must be lodged by 17 August 1998

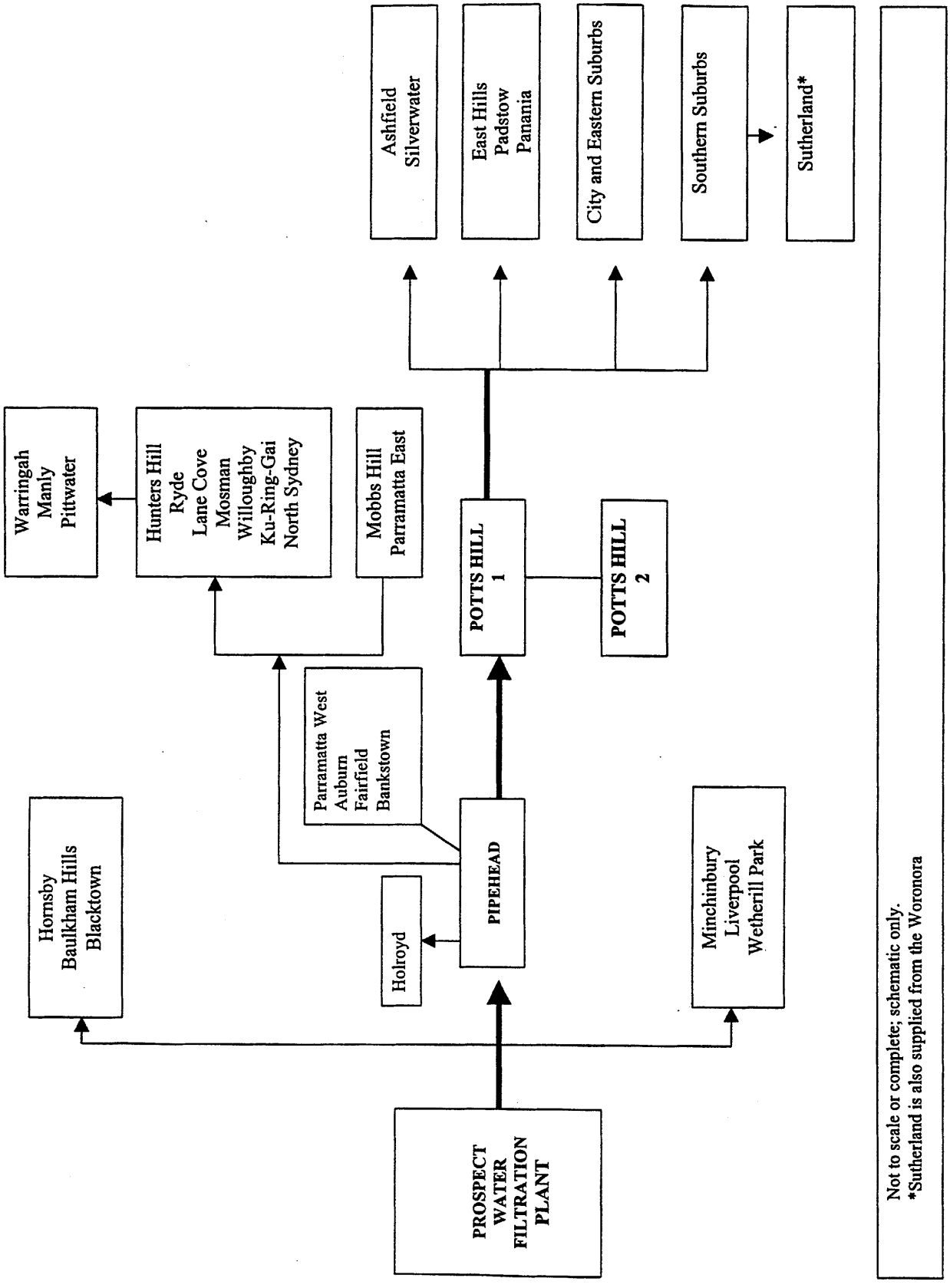
D Map of the Warragamba Catchment



E Diagram of the Prospect plant



F Diagram of the system after Prospect plant



G MoU with NSW Health

MEMORANDUM OF UNDERSTANDING

THIS MEMORANDUM is entered into on the 11 day of November 1997.

BETWEEN THE SYDNEY WATER CORPORATION (the Corporation)

OF THE ONE PART

AND THE NSW HEALTH DEPARTMENT (the Department)

OF THE OTHER PART

CONTEXT

A. The Corporation is a company state owned corporation (SOC) under the State Owned Corporations Amendment Act 1995. The Corporation has a responsibility to supply safe drinking water to its customers in accordance with its Operating Licence granted under the Water Board (Corporatisation) Act 1994.

B. The Department has a role in providing advice to the Government on standards in relation to drinking water quality and to commit the Corporation to supplying water which is safe to drink having regard to public health.

C. The Minister for Health and the Director-General of the Department have certain responsibilities in relation to the protection of public health under the Public Health Act 1991 and other relevant legislation. The Department's roles and responsibilities as outlined in this Memorandum are in addition to any functions conferred upon the Department, the Director-General of the Department or the Minister for Health under the Public Health Act, 1991.

D. The Director-General of the Department is a "regulatory agency" within the meaning of Division 3, Part 6 of the Act.

E. The objective of this Memorandum is to formally set out the terms of a co-operative relationship between the parties, establish their respective roles, facilitate fulfilment of each party's function in relation to the protection of public health, and to fulfil the requirements of section 35 of the Act and the Corporation's Operating Licence.

F. It is recognised that the Independent Pricing and Regulatory Tribunal has a role in setting the Corporation's prices for services which takes into account community preferences including their willingness to pay or accept risk.

Interpretation

1.1 Unless otherwise specified, terms in this Memorandum shall have the same meaning as provided by the Act or the Operating Licence.

1.2 "Act" means the Water Board (Corporatisation) Act 1994.

"Water supply system" includes all those systems, from the catchment to the consumer's tap, utilised by the Corporation to supply drinking water in the Licence Area.

1.3 Headings and numbering are for convenience only and do not affect the interpretation of this Memorandum.

2. The regulatory agency

2.1 The Director-General of the Department is specified as a "regulatory agency" under section 34 of the Act. The Corporation's Operating Licence requires it to enter into a Memorandum of Understanding with the Department. For clarification, it is agreed that the Department will fulfill the Director-General's responsibilities under the Act and the Department shall act as the regulatory agency in accordance with this Memorandum.

3. Term

3.1 The term of this Memorandum shall be for the period commencing on the date of execution hereof and remaining in force for the term of the Corporation's Operating Licence.

4. Liaison between the Corporation and the Department

4.1 The Director-General of the Department and the Managing Director of the Corporation or senior officers nominated by them shall meet regularly to discuss the broad principles, directions and policies underlying the roles and responsibilities of the parties under this Memorandum.

4.2 A Strategic Liaison Group will be established to:

- annually review progress on the implementation of this Memorandum;
- consider long term strategic issues and policies and to define and implement processes for the interchange of strategic planning information;
- establish data sharing programs;
- establish programs of investigations, feasibility studies and economic analyses to be undertaken by the Corporation to meet changing public health objectives in

relation to drinking water; and

- make recommendations to the Director-General of the Department and the Managing Director of the Corporation regarding the updating of this Memorandum.

The Strategic Liaison Group may establish ad hoc joint working parties to investigate and formulate recommendations on specific and technical issues, as required.

4.3 The Membership of the Strategic Liaison Group (unless otherwise agreed between the parties) will be as follows:

Corporation:

General Manager Corporate Strategy and Business Planning
Group General Manager Utilities
Group General Manager Transwater

Department:

Director, Centre for Disease Prevention & Health Promotion
Manager, Environmental Health Branch
Officer of the Environmental Health Branch (1)

5. Dispute Resolution

5.1 Where a dispute between the parties cannot be resolved by the Strategic Liaison Group then it should be referred to the Chief Executive Officers for resolution. In the event that the dispute cannot be resolved by the Chief Executive Officers, the view of the Department shall prevail.

6. Amendment

6.1 This Memorandum can be amended at any time upon agreement between the parties and in accordance with section 36 of the Act. Where agreement is not reached, the view of the Department is to prevail in accordance with section 35(3) of the Act.

7. The Corporation's roles and responsibilities

7.1 The Corporation shall ensure that all drinking water it supplies is safe to drink having regard to the health of the public, and that it is supplied in accordance with its Operating Licence.

7.2 Under its Operating Licence, the Corporation must immediately meet the health related aspects of the NHMRC and AWRC guidelines *Desirable Quality For Drinking Water In Australia 1980.*

7.3 The Corporation must:

(a) meet the health related parameters of the NHMRC and ARMCANZ *Australian Drinking Water Guidelines 1996* from 1 July 1997.

(b) investigate customer complaints regarding water quality.

7.4 The Corporation shall consult with the Department in relation to planning issues which arise from changes in the NHMRC and ARMCANZ Drinking Water Guidelines from time to time.

7.5 The Corporation shall prepare within three months of the signing of this Memorandum a comprehensive water quality monitoring plan for the water supply system, which it will submit to the Department for review and approval. The monitoring plan shall:

- include a statistically valid sampling program which meets the intent of the NHMRC and ARMCANZ Drinking Water Guidelines as in force for the time being;

- require that samples be tested in accordance with the testing requirements of the 18th edition (1992) of Standard Methods for the Examination of Water and Wastewater published by the American Public Health Association or other established methods as appropriate;

- provide for a format for the presentation of monitoring results to the Department;

- be reviewed and updated on an annual basis to reflect the changing requirements of this Memorandum.

The Corporation shall carry out a monitoring program in accordance with the monitoring plan.

7.6 The Corporation shall develop and maintain an effective system of quality assurance for monitoring (sampling and testing) and reporting in relation to the water supply system.

7.7 The Corporation shall submit to the Department:

(a) immediate notification of any water system event or any monitoring results which indicate the potential existence of a public health hazard;

(b) quarterly, monitoring results as agreed in the monitoring plan together with an evaluation of the results on an exception basis;

(c) on an annual basis, the results of a full range of appropriate health related parameters as approved by the Department, accompanied by the Corporation's analysis of conditions relevant to the interpretation of data or system descriptions indicating potential health-related problems, together with an evaluation of the

results on an exception basis;

(d) an annual report comparing actual drinking water quality against the requirements of the NHMRC and AWRC/ARMCANZ Guidelines which the Corporation is obliged to meet in accordance with its Operating Licence and clauses 7.2 and 7.3. This Report shall contain a proposed plan of action to address any issues which arise in relation to meeting the requirements of the relevant Guidelines; and

(e) an annual water quality improvement plan for the water supply system incorporating system and operational changes needed to address problems identified through water quality monitoring data and through periodic system inspections and evaluations.

7.8 The Corporation shall prepare a report for publication on an annual basis listing all routine water quality testing conducted and results obtained in a format appropriate for the Department's use.

7.9 The Corporation shall fluoridate all drinking water supplies as required by the Fluoridation of Public Water Supplies Act 1957. Fluoride shall be sampled and reported in accordance with the requirements of the Fluoridation of Public Water Supplies Act 1957.

7.10 The Corporation shall prepare and submit to the Department for review and comment, a Comprehensive Water Quality Management Strategy outlining its current and long term intentions for water supply, wastewater reclamation and public health aspects of wastewater disposal. The Plan shall be revised no less frequently than every 5 years, or whenever changes occur that substantially alter the basis of the existing plan.

7.11 The Corporation shall provide the Department with all data and all information on the planning, design, maintenance, operation and administration of the Corporation's activities that the Department reasonably requires to make informed judgements regarding matters relating to the protection of public health.

7.12 The Corporation's responsibilities under this Memorandum apply to the whole of the Corporation's operations (including the whole of its water supply system), including those operations which are performed by a third party.

7.13 The Corporation shall allow officers of the Department to enter any premises under its care and control, including facilities performing water supply, wastewater reclamation and reuse, or wastewater treatment and disposal, for the purposes of carrying out any inspections or viewing any records which the Department reasonably requires to make informed judgements regarding matters relating to the protection of public health.

7.14 The Department is a relevant agency for the purposes of clause 5.3 of the Operating Licence and shall be consulted by the Corporation during any review of the joint plans of management for its water storage catchments. Where the Department makes any

comments upon the plans, it shall be entirely the responsibility of the Corporation to consider such comments and take any appropriate action which may be necessary to protect public health.

7.15 The role of the Corporation as a service provider to ensure public health protection must be recognised and any conflict or matters of mutual concern to both public health and environmental protection approaches, will require consultation between the Corporation, the NSW Environment Protection Authority and the Department.

8. The Department's role and responsibilities

8.1 The Department agrees to provide general advice to the Corporation on matters regarding the supply of water which is safe to drink and on other public health issues in regard to water which relate to the Corporation's activities.

8.2 The Department shall develop a public water supply regulatory program for the purpose of making independent judgements on public health matters related to the Corporation's activities.

8.3 Where any drinking water supplied by the Corporation is failing to meet the Drinking Water Guidelines which the Corporation is required by its Operating Licence and clauses 7.2 and 7.3 to meet, or where the provision of drinking water, or the reclamation, reuse, disposal, or treatment of wastewater takes place in such a manner that a hazard to public health may arise, the Corporation shall be responsible for assessing the problem and proposing rectification action. If the Department is of the opinion that it is appropriate to do so, it may provide advice on rectification action which may be taken by the Corporation. Where the Department gives any advice to the Corporation under this clause, it shall be entirely the responsibility of the Corporation to take appropriate rectification action to ensure that: the drinking water it supplies is safe to drink and meets the requirements of the Corporation's Operating Licence and clauses 7.2 and 7.3; and that other activities are conducted in a manner that do not pose a potential hazard to public health. For the purposes of this exercise, the Department will use the current NHMRC and ARMCANZ Drinking Water Guidelines as in force for the time being for guidance in providing such advice in relation to drinking water.

9. The Licence Regulator

9.1 The Department shall give such information to the Licence Regulator as the Licence Regulator requires, or the Department considers it appropriate to provide, for the purpose of the Licence Regulator exercising its functions under the Act.

10. Emerging Public Health Issues Related to Drinking Water

10.1 The parties shall co-operatively exchange information and the Corporation shall participate in appropriate research and development on emerging public health issues related to drinking water so as to enable them to make well informed judgements regarding action to be taken in relation to the Corporation's water supply system to maintain the protection of public health.

10.2 The parties shall independently provide input to public discussion and debate on future revisions of the NHMRC and ARMCANZ Drinking Water Guidelines.

11. Events of Public Health Significance

11.1 The parties shall nominate a 24 hour incident management contact point for the coordination of responses to any event of public health significance.

11.2 The Corporation shall immediately report to the Department any event within its water supply system, or within its wastewater reclamation and reuse and wastewater treatment and disposal operations which may have significant implications for public health.

11.3 The Corporation will prepare and demonstrate to the satisfaction of the Department its preparedness for contingency, emergency and disaster response, for the Corporation's drinking water supply systems, wastewater reclamation and reuse and wastewater treatment and disposal operations.

12. Data Exchange

12.1 The Department will provide the Corporation with reports and studies it undertakes which are relevant to those activities of the Corporation which impact on public health.

12.2 The Corporation will provide reports and studies undertaken by the Corporation as part of its business which are relevant to public health.

IN WITNESS WHEREOF the parties have executed this document at the date first mentioned.

SIGNED for and on behalf of the
NSW DEPARTMENT OF HEALTH
in the presence of

.....
Michael Reid
Director-General
Department Of Health

.....
Signature Of Witness

.....
(Print) Name Of Witness

SIGNED for and on behalf of the
SYDNEY WATER CORPORATION

.....
Paul Anthony Broad
Managing Director
Sydney Water Corporation

.....
Signature Of Witness

.....
(Print) Name Of Witness

H Joint chronology agreed between Sydney Water and NSW Health

Wednesday 15 July

Normal monitoring/routine sampling of water treatment system by SWC.

Tuesday 21 July

- SWC initiates incident management process following positive result from sample taken on 15/7/98 showing low level *Cryptosporidium* and *Giardia* at outlet to Prospect plant and outlet to Potts Hill reservoir.

- NSW Health, Environment Health Branch, received a call (am) from Sydney Water reporting positive testing of Potts Hill (2C/2G) and Prospect (0C/3G) (sampling had been done on 15 July). Consequently, further sampling and testing was being done downstream from the reservoirs.

- SWC orders retesting of the positive sites and other testing throughout the Potts Hill system and the outlet of the Prospect plant. This is normal SWC practice agreed to by NSW Health.

- SWC reviews Prospect plant records for 15/7/98 and finds them within specification

Wednesday 22 July

- SWC test results for 21/7/98 samples all clear except for garden tap in grounds of Sydney hospital.
- Sydney Water rang NSW Health, Environment Health Branch (pm) advising testing of the City reticulation system had found 1 *Giardia*/100 litres and SWC was flushing the mains and retesting).

- SWC reorder testing local to Sydney Hospital and upstream, including inlet of Potts Hill. Flushing the local system. Taking further samples for testing. NSW Health concurred.

Thursday 23 July pm

- SWC receives test results for 22/7/98.

- SWC notified NSW Health that no *Cryptosporidium* and no *Giardia* were found in samples from Elizabeth Bay, the Rocks, Waterloo, and Centennial Park and Potts Hill inlet. However, at Macquarie Street / Sydney Hospital had detected 43 *Cryptosporidium* and 19 *Giardia* per 100 Litres. Sydney Water suspected that this had occurred as a result of a cross-connection within the hospital grounds. Consequently SWC advised NSW Health that a meeting was required and Health provided relevant contact details for the hospital.

- Meeting convened between Sydney Hospital engineers and SWC in an attempt to find a potential source of cross-contamination. SWC talks to hospital engineer and

- SWC takes more samples from the area downstream from Potts Hill, testing for *Cryptosporidium* and *Giardia*. NSW Health also asked SWC to measure other parameters such as faecal coliforms, heterotrophic plate counts, and chlorine levels. This was already under way by SWC.

Friday 24 July

- SWC reviews further data from Prospect plant which indicates the plant is operating within contract specifications.

- SWC discusses problem and precautions with Sydney Hospital again and suggests again that it drain its storage tank. Sydney Hospital agreed and took action.

- SWC undertakes resampling and water flushing in College Street and Crown Street areas.

- SWC obtains further tests results in vicinity of Sydney Hospital. All results are negative except for Sydney Hospital and the Art Gallery which have the same water supply.

- SWC notified NSW Health: Sampling of the level of the Art Gallery-Domain had detected 16 *Cryptosporidium*/ 16 *Giardia* and Sydney Hospital result 1 C 0G; all other results outside the Eastern CBD were negative and more results were pending. SWC was looking for potential cross contamination in the Eastern CBD

Saturday 25 July

- SWC's sample results of tests performed on 24/7/98 show negative for some sites and significant increase for others.

- NSW Health received a call at 6.35pm from Sydney Water who reported that testing of first flush water from the following locations had detected:

Macquarie St (near Sydney Hospital)	161 *Giardia*	15 *Cryptosporidium*
near the Art Gallery	106 *Giardia*	10 *Cryptosporidium*
Hospital road	0 *Giardia*	0 *Cryptosporidium*
Liverpool St and Hyde Park	0 *Giardia*	0 *Cryptosporidium*
Crown St. pumping station	5 *Giardia*	10 *Cryptosporidium*

  Sydney Water suggested that a possible explanation was that cysts that naturally collect over years in the biofilm lining the water pipes had been released by a combination of high chlorine levels, and the sudden flushing of the pipes in the sampling process. Dead ends were considered a possible factor.

- Sydney Water agreed with Health that it would search for possible local causes of contamination, but none were identified.

- Crown Street pumping station results are positive and SWC orders a physical check of Crown Street reservoir but nothing unusual is detected.

- NSW Health received a call from SWC at 7.50 pm who reported that testing of first flush water from College St had detected 461 *Giardia* and 104 *Cryptosporidium* cysts. The sample, however, was hard to process. Sydney Water advised that another

possible cause was local contamination resulting from a backflow.

- SWC and Health agree that SWC will seek independent validation of the test results from Macquarie University due to the magnitude of the readings.

- SWC commences and expands retesting program.

- SWC orders testing relevant to distribution of water to the Northern Suburbs of Sydney.

Sunday 26 July

- SWC undertakes systematic scouring and flushing program for the Crown Street reservoir affected zone. SWC undertakes a visual inspection of Potts Hill reservoir.

- Macquarie University experts do "blind" review of Ensight test slides and the counts for *Cryptosporidium* and *Giardia* were validated, however the attempts to do speciation and viability were not successful.

- SWC receives test results from 25/7/98. High levels in Crown Street system identified. SWC orders and implements further analysis of test results and sampling. SWC reviews chlorine levels in the water system and they are acceptable. SWC receives test results for system delivering to the Northern Suburbs. Results are clear. SWC receives one small reading upstream of the Crown Street reservoir. SWC reviews dirty water complaints received by its call centre and none are reported for the Eastern CBD.

- NSW Health received a call from Sydney Water who reported that testing of water from the following locations had detected:

Macquarie St:	3952 *Giardia*	376 *Cryptosporidium*
Museum	332 *Giardia*	170 *Cryptosporidium*
Art gallery	963 *Giardia*	200 *Cryptosporidium*
Crown St.	20 *Giardia*	6 *Cryptosporidium*
Pressure tunnel	0 *Giardia*	0 *Cryptosporidium*
City Tunnel	8 *Giardia*	0 *Cryptosporidium*

The cause of these findings was unclear, but possible explanations to Health by SWC included release of organisms from biofilms, or localised contamination from a backflow.

SWC reported to Health they were continuing to flush the water system to remove possible contamination.

SWC continued to advise Health that these levels may represent a build up of low levels of organisms in the biofilm inside the pipe released while flushing occurred.

- SWC undertakes widespread flushing and testing for affected area and surrounding sites including tests beyond those for *Cryptosporidium* and *Giardia*. SWC undertakes scouring late into the evening and scours left open all night. Testing is carried out with the scouring. SWC incident management team continues investigation into possible causes/sources of contamination. Health concurred with these actions.

Monday 27 July

- SWC reviews operations records of Prospect water filtration plant. SWC orders samples to be taken from Potts Hill reservoir. SWC report new evidence that the source of organisms was now likely to be a local inflow of untreated water due to negative pressure in the pipes related to nearby construction that allowed material around the pipes, that could include faecally contaminated water, to be drawn in.

- SWC provides latest test results to include:

Liverpool and Crown street	1*Cryptosporidium*	16 *Giardia* (pre flush)
Thornleigh	0	0
West Ryde	0	0

- SWC advises NSW Health that contamination may have been caused by a negative pressure event in the effected areas.

- NSW Health convened a teleconference between 11:45 am - 1:15 pm of Sydney Water and experts in water testing, infectious diseases and public health.

  Summary of teleconference. The findings to date, possible explanations and corrective action taken by SWC were discussed. SWC suggested that a likely explanation for the contamination was localised episodes of negative pressure which allowed entry of untreated water into the system. The samples tested to date supported the theory that an ingress of untreated water had occurred. Concern was expressed for residents and people commuting to the affected area and especially for the immunocompromised. The teleconference agreed that there was a need for a public health warning and the issuing of a 'boil water' advice.

  The meeting agreed that Sydney Water should urgently:

  - release a press statement warning persons in the affected area of the eastern Central Business District not to drink unboiled water the text of which would be agreed between SWC and NSW Health and released in time to make the evening TV news
  - continue the search for a possible source of contamination
  - continue flushing of the system
  - personally warn customers in the affected area that day, including building owners/operators
  - additional testing of affected area
  - set up a hotline.

  Discussion followed about lifting the 'boil water' advice. SWC agreed to continue to investigate the extent of contamination. The 'boil water advice' would be lifted if further investigation showed that the contamination did not extend beyond the area currently affected and that testing of samples were negative on three consecutive occasions. SWC media and Health media were to liaise on the media release.

Health Version of events of Monday afternoon

1. At 2pm Ms Armistead NSW Health media contacted Rod Metcalfe SWC media regarding the proposed media release. It was agreed:

   - that the release should contain a warning message to boil water for one minute before drinking
   - a warning to seek medical advice should be given if people had any symptoms.
   - NSW Health fact sheets on *Cryptosporidium* and *Giardia* would be distributed with the media release.

   NSW Health fact sheets for both the general public and specifically for immunosuppressed people were faxed to SWC.

2. At 3pm Ms Armistead contacted Rod Metcalfe regarding the media release and was advised it was still being worked on. Mr Metcalfe agreed to send the release to NSW Health to check when ready.

3. SWC media recommended a media conference for 3.30pm, which was rejected by Health media (Ms Armistead) on the basis that it would make the issue bigger than it was.

4. DG Health contacted the MD SWC, who was unaware that the press conference proposed by his organisation, to reiterate that Health did not support a press conference to be undertaken by SWC with Health participating.

5. At 4pm Ms Armistead contacted Mr Metcalfe regarding the whereabouts of the press release and was advised it was being checked by SWC officials.

6. At 5pm NSW Health received a draft media release from SWC via fax.

7. At 5.15 pm NSW Health recommended changes to the release to Mr Metcalfe via telephone. NSW Health requested the completed release be faxed back to NSW Health for its records.

8. At 6pm NSW Health contacted SWC to ask for a copy of the completed release. Mr Metcalfe advised the release had been sent out at about 5.45pm. At 6.15pm received a copy of the release from SWC.

SWC Version of events of Monday Afternoon

1. SWC recommended a media conference for 3.30 pm, which was rejected by Ms Armistead who stated it would make it a bigger issue than it was.

2. The DG of Health contacted the MD SWC and reiterated that he did not support a press conference and that if SWC held a press conference Health would not take part.

3. A first draft press release was faxed to Ms Armistead at Health media prior to 3.30pm.

4. At 4pm Ms Armistead contacted Mr Metcalfe and advised of requested changes including removal of any Health statement of support for SWC actions.

5. A final press release occurred at approximately 5.30pm. A copy was faxed to Health at approximately 6.15pm.

- NSW Health begins to receive media calls requesting information on *Cryptosporidium* and *Giardia*. NSW sent out its fact sheets to media. NSW Health provides advice to the media**.**

- Prior to releasing the press release SWC prepared an information pack for all call centres and customer centres and organised a 1800 number with Telstra. The information pack contained the release, background information, questions and answers about *Cryptosporidium* and *Giardia* and advice on boiling water. Call centres were fully briefed.

- SWC also began to receive media calls and hotline calls.

- SWC receives test results of sites sampled in Crown system on 26/7/98 which all returned clear. SWC orders confirming tests for the Crown Street system. SWC commences to contact all affected customers. SWC converts media release to a letter for postal drop on 28/7/98 and 1800 number operations established.

- At 4.05 pm SWC provides latest test results to NSW Health as follows:

Macquarie St	0 *Giardia* 0 *Cryptosporidium*
Art gallery	0 *Giardia* 0 *Cryptosporidium*

  At 6.32pm SWC provides further results to NSW Health as follows:

College St	0 *Giardia* 0 *Cryptosporidium*
City Tunnel (Greenacre)	0 *Giardia* 0 *Cryptosporidium*
Crown Street Reservoir	0 *Giardia* 0 *Cryptosporidium*

  At 9.55pm SWC advises NSW Health that Rockdale and Waterloo pumping stations were all clear**.**

- SWC considered that the clear result in the city further supported the theory of local contamination which had now been cleared. SWC ordered further tests to confirm this.

- SWC were notified in the early evening of a 300mm main break in Oxford Street. SWC inspects and considers whether this was the cause of the contamination but rejects this proposition due to nature of cracking of pipe.

Tuesday, 28 July

- SWC completes letter box drop to all customers in Eastern CBD area.

- SWC receives very low results in Rhodes. SWC orders visual inspections and testing of suction well site (source of Rhodes supply). Rhodes system flushed as a precautionary measure. SWC takes further samples throughout the system up to Potts Hill. SWC receives results for samples taken on 27/7/98. Low positive results in Macquarie Street, College Street and at Crown Street reservoir. SWC decides to drain Crown Street reservoir.

- NSW Health prepares statement for the Sydney Morning Herald.

- From 2.55pm SWC informed NSW Health of the following results:

Art Gallery	0 *Cryptosporidium*	0 *Giardia*
Sydney Hospital Tank	0 *Cryptosporidium*	0 *Giardia*
College Street	4 *Cryptosporidium*	6 *Giardia*
Macquarie Street	2 *Cryptosporidium*	1 *Giardia*

At 8.45pm SWC informs Health of Rhodes retesting results: 0 C 0 G

From about 9.20 pm SWC advised NSW Health of the following results

Darling Point	0 *Cryptosporidium*	0 *Giardia*
Dover Heights	0 *Cryptosporidium*	0 *Giardia*
Shaft 3	0 *Cryptosporidium*	0 *Giardia*
Shaft 17	0 *Cryptosporidium*	0 *Giardia*
Albert St	0 *Cryptosporidium*	0 *Giardia*
Prospect WTP	0 *Cryptosporidium*	0 *Giardia*
Crown St Reservoir	0 *Cryptosporidium*	14 *Giardia*

Wednesday 29 July

- At 10.30am SWC faxes Health a summary of available test results**.**

- SWC receives a report on Prospect turbidity and plant maintenance.

- At 12.45pm Ms Armistead, NSW Health media phoned Mr Metcalfe SWC media to advise that an updated local boil water advice would probably be called for at a forthcoming meeting between SWC and NSW Health. Ms Armistead asked Mr Metcalfe to prepare a 'boil water" advice in anticipation of the request to ensure that any time extension of the advice went out promptly. Mr Metcalfe indicated he would await the advice of the meeting.

- At 1.30pm meeting held between SWC and NSW Health where:
  - it was decided to continue the 'boil water ' advice for eastern CBD
  - results of sampling done on 26 and 27 July were encouraging with no

Cryptosporidium/no *Giardia* detected in various samples in the eastern CBD area (Macquarie St, College St, Main City Tunnel, Crown Street Reservoir, Art Gallery); only one sample was positive for *Giardia* (4/100 litres taken at Llewellyn St)

- and the meeting concluded at approximately 2.45pm

NSW Health considered the outcome of the meeting was that SWC would issue a media release the text of which would be agreed between Health and SWC. SWC considered the outcome of the meeting was that it would place an advertisement in the next day's papers and letter drop all affected customers.

- At 3.40pm Ms Armistead, NSW Health media contacts Mr Metcalfe SWC media, regarding the issuing of a local 'boil water' advice for an extended period. Mr Metcalfe advised that SWC would prefer to place another advertisement in the newspapers as they had done that day. Ms Armistead advised that Health would prefer the wider circulation of a media release. Health media confirmed with Dr Jeremy McAnulty that NSW Health would prefer a media release.

- Between 3.40pm and 4.25pm a draft media release was discussed between SWC media and NSW Health media with Health requesting substantial amendment.

- At 5pm Ms Armistead, Health media contacted Mr Michael Reid Director General requesting he contact the MD SWC to ensure the updated local 'boil water' advice was put out.

- DG Health contacts MD SWC advising that SWC issue updated local 'boil water' advice as soon as possible.

- DG Health phoned Minister Refshauge's office to contact Minister Knowles' office to ensure updated local 'boil water' advice was issued by SWC as soon as possible.

- SWC issues updated media release at about 5.45 pm. SWC contacts and discusses release with all major metropolitan media outlets. In addition SWC it continues advertisements in the Sydney Morning Herald and Daily Telegraph (for the 30/7/98)

- At 6.25pm Health receives media release from SWC on updated local 'boil water' advice.

- Early evening SWC receives positive result from sample of sediment taken in Prospect CWT1 on 28/7/98 (which was offline for maintenance). SWC receives Potts Hill reservoir positive result later that night. SWC receives Enfield Shaft 6 positive result later again. SWC orders upper canal inlet to Prospect filtration plant closed as a precautionary measure. SWC makes arrangements to deliver crane to site, should it be necessary to by-pass the Prospect filtration plant. SWC orders Warragamba inlets, system extremities and Prospect CWT2 to be sampled in addition to other sampling of the system.

- SWC and AWS liaise to modify operation of plant eg more frequent backwashing, maintaining constant flow through the filters (effectively bypassing the Clear Water Tank 2) and increased upstream chlorination.

- SWC decides to flush city again from Crown Street downstream.

NOTE: NSW Health and SWC have provided separate detailed accounts of the events of the evening of Wednesday 29 July 1998. Health commences from 9.30pm. SWC commences from approximately 8pm.

Thursday 30 July

- SWC provides a summary of current test results from 29/7/98 to Health as they came to hand.

Potts Hill site 2	0	*Cryptosporidium*	0	*Giardia*
Potts Hill site 3	0		0	
Suction Well	2		5	
Suction Well (retest)	0		0	
Prospect Plant	0		0	
Crown Street	1		1	
Art Gallery	4		0	
College Street	2		0	
Macquarie Street	1		0	
Potts Hill site 1	10		48	
Potts Hill site 4	6		0	
Pressure tunnel (Enfield)	12		136	
City tunnel	24		27	

- SWC commences inspection of upper canal. SWC switches Sutherland Shire from Prospect to Woronora. Prospect flow reduced to a minimum.

- SWC meets with AWS to discuss actions taken. Possibility of flushing backwash from the Prospect plant into Prospect reservoir canvassed.

- SWC seeks technical experts to assist in call centre operations to manage customer enquiries. SWC accelerates sampling of Prospect plant.

- SWC seeks permission from EPA to divert backwash into Prospect reservoir. EPA advises it would not prosecute in the event of such diversion. SWC diverts Prospect plant backwash to avoid protozoa concentration. SWC inspects sediment of CWT1 at Prospect plant. SWC analyses how to minimise water flow through Prospect plant and devises plan accordingly. SWC undertakes further review of chlorine ratios.

- At 3.45pm SWC receives Warragamba pipeline #1 results: 0 Cryptospiridium 0 *Giardia*. SWC receives positive results at the filtration plant. At 4pm SWC decides to by-pass the Prospect filtration plant to bring clean, chlorinated Warragamba Dam water to the system.

- At 4pm meeting held between officials of SWC, Health and Premier's Department.

- SWC receives significant high results at the Prospect plant from 29/7/98 samples.

- At 4.30pm meeting held with Premier, Minister Knowles, SWC and Health officials. Decision made at meeting to extend 'boil water' advice to all of Sydney. Positive results at Palm Beach from samples taken on 29/7/98 received during the meeting.

- At about 5.15 Premier's and Minister Knowles' staff draft press release in

consultation with SWC and Health. Media release issued by SWC extending 'boil water' advice to all of Sydney.

- SWC commences to phone major affected organisations such as councils, schools and hospitals.

- SWC commences planning for by-pass and issues "emergency notice" to AWS.

- SWC becomes aware that operational difficulties make it impossible to by-pass the Prospect plant unless a CWT could be used to balance the pressure in the system. SWC continues to work on these difficulties to effect the bypass.

- SWC receives positive reading on Warragamba #2 pipeline outlet and decides to close Warragamba #2 pipeline. SWC orders further sampling of Prospect CWT2. Approximately 30 samples are ordered across the system. SWC moves Warragamba Dam offtake screens to improve water quality and closes Warragamba #2 pipeline.

- Chief Health Officer contacted by Sydney Water confirming that they had extended the boil water advice to most of Sydney.

Friday 31 July

- From 1am SWC begins refilling Prospect CWT1 as part of the by-pass process. SWC receives Prospect filtration plant distribution chamber test result: 0 *Cryptosporidium* 0 *Giardia*; Warragamba#2 result 0 *Cryptosporidium* 0 *Giardia*. SWC reopens Warragamba 2 pipeline after recommissioning the chlorine plant at the upstream end of the pipeline.

- SWC devises protocols for purging the system once it is given the all clear including the list of reservoirs that can be isolated. SWC devises work plans for cleansing each delivery system. SWC advises all systems managers to scour and flush all reservoirs. Preparatory work on Prospect by-pass continues. Further samples taken at Warragamba.
- Meeting between Health and SWC held. Health advises expert panel is to be convened that evening. SWC provides updated test results from 30/7/98 to Health including:

Prospect Plant Outlet	765 *Cryptosporidium*	230 *Giardia*
Palm Beach	365	151
Warragamba #1	0	0
Warragamba #2	0	0

- Meeting between Minister Knowles, AWS and the MD SWC to discuss Prospect by-pass.

- Minister Knowles announces establishment of expert panel.

- **Composition of Expert Panel:**

Professor Syd Bell	Executive Medical Director South Eastern Area Laboratory Services
Professor Tania Sorrell	Professor Infectious Diseases and

	Microbiology
Dr John Walker	Head of Parasitology
Dr Duncan Veal	Senior Lecturer Biological Sciences, Macquarie University
Professor Lyn Gilbert	Director CIDM Laboratory Services

A sub-group of the expert panel met with SWC officers at Sydney Water at 5.30pm. The expert panel requested that a turbidity monitoring alarm be set at 5NTU for the inlet water to the Prospect Reservoir. The expert panel agreed on the following criteria for the 'clearance' of treated water from Prospect:

- at least 3 negative 100L tests for *Cryptosporidium* and *Giardia* over 36 hours with a test recovery efficiency of 50%. The first negative test in this sequence being 0 C 0G at Prospect plant was taken at around 2100 hours on Thursday 30 July 1998.

- the panel required continuing clear sampling of at least 2 samples every 24 hours.

- In addition any turbidity above 5NTU at the inlet will require an additional sample.

The expert panel and Sydney Water agreed that should testing overnight continue negative, then fluoridation at Prospect be turned off no earlier than 0900 hours on 1 August 1998 to create a possible marker of clean water moving through the system.

It was agreed that 'clearance' of the remaining system would require testing of representative sites, spaced over time.

Saturday 1 August

- SWC begins major cleaning program. Reservoirs begin to be isolated. Fluoride turned off at plant. Mains flushed - system purged by pulling fresh water through as quickly as possible. This process continues until 4/8/98.

- SWC tests to detect fluoride trace in system and comparison with computer modelling to determine travel times for clear water and to assist expert panel to decide when to declare areas safe.

Expert Panel Teleconference 11 am (NSW Health and Expert group)

The full panel reviewed the sub-group's deliberations and it was agreed that any *Cryptosporidium* oocysts detected for viability and species using an experimental technique. The panel agreed to meet to consider any test results for *Cryptosporidium* of greater than 10/100 l. The expert panel signs off on SWC's revised protocol.

- Minister Knowles meets with expert panel prior to press conference.

- At press conference Minister Knowles releases media release estimating 6 - 8 days for complete cleansing.

- Immediately after the press conference Minister Knowles, SWC and NSW Health met with the expert panel. SWC were advised of the revised clearance protocol.

- SWC sends slide samples to Thames Water, London for independent assessment of presence of *Cryptosporidium* and *Giardia*.

- At 6.20 pm CHO confirms the expert panel had advised that the Prospect Plant had met the criteria for clean water.

Expert Panel Teleconference 10 pm.

At 10pm SWC presents its results to the expert panel in teleconference. SWC then left teleconference leaving expert groups to discuss the results.

The expert panel noted that '10 x 10L' samples from Prospect South had been completed and a 0/0 result had been reported for *Giardia* and *Cryptosporidium*. The panel also noted that no evidence of clearance of the fluoride marker from the zone was available. The panel declined to declare Prospect South clear.

The panel resolved that the fluoride marker was at this time a necessary criterion for clearance of a zone or part of a zone. In the case where the fluoride marker evidence could not be provided, the expert panel would have to consider these on a case by case basis. Urgent advice should be provided of such cases where fluoride marker evidence in unavailable.

Where a zone or a part of a zone has satisfied the criteria the committee resolved that Dr Andrew Wilson would have executive power to authorise the announcement of a lifting of the boil water alert for that zone or part zone. In such cases, advice of the fluoride concentration and '10 x 10 L' test results would be forwarded by fax to Dr Wilson for authorisation.

Sunday 2 August

- Expert retained by SWC arrives from the USA.

- At 11am a teleconference is held between SWC and the expert panel.

Expert Panel Teleconference 11 am.

The panel noted advice from SWC that monitoring of clean water flow using fluoride as a marker had proved technically difficult due to residual fluoride in the system and background fluoride.

The expert panel agreed to revise their criteria for clearance of an area to the following: where an area is proximal to the Prospect treatment facility and water flows through it into another area, the proximal area will be clear when it tests negative for *Giardia* and *Cryptosporidium* by the '10 x10 L' method and the downstream area also has a negative '10 x 10 L', as well as the proximal area having had 24 hours of clean water flowing through it, as calculated by the hydrology from 2100 hrs on 30 August 1998.

The panel agreed that any positive result for *Cryptosporidium* should lead to testing of that sample for species and viability.

The panel requested that Sydney Water implement a prospective monitoring alarm on turbidity of treated water leaving the Prospect plant of 0.1 NTU.

In regard to the affected suburbs in the Sutherland Shire, the expert panel agreed that there was compelling evidence from analysis of water hardness characteristics to conclude that the water previously sourced from Prospect for that area had been flushed from the system since the switch over to the Woronora supply at 0800 hours on 30/7/98. In addition, Sutherland Shire tested negative on a " 10 x 10" for g and c . On this basis, and subject to written confirmation of previous negative background tests for g and c at Woronora dam from May 1998 to the present, the expert panel agreed to recommend the authorisation of Sutherland Shire to be announced as clear.

- Teleconference held with Minister Knowles, SWC and Health.

- SWC identifies postcode areas to be released from 'boil water' advice and these are sent to Minister Knowles' office. Minister Knowles releases first areas accordingly and process continues continually until all of Sydney is cleared on 4/8/98.

- Meeting between SWC, Minister Knowles and his staff. Minister Knowles informed of unconfirmed positive test for *Cryptosporidium* and *Giardia* in Illawarra. SWC advises Health of Illawarra result. Illawarra sample is retested and is clear.

- Colin Fricker independent expert from Thames Water arrives.

- Suburb by suburb clearance continues.

3 August 1998

- Thames Water report to SWC confirms validity of Ensight results.
- Discussion between SWC and Health regarding test protocol following criteria set by expert panel.
- Suburb by suburb clearance continues.

4 August 1998

- Tony Myers, water treatment expert from the USA retained by SWC arrives.

- At 9am a teleconference is held with the expert panel.

Expert Panel Teleconference 9 am

The panel noted data from Sydney Water that indicated that 90% of Sydney Water had tested clear by the '10 x 10 L' criterion and that negative '10 x 10 L' tests had been recorded along the extreme distal arms of the system. Since proximal areas were all clear and distal testing was also clear, the panel agreed to lift the 24 hour flow criterion for the outlying zones and recommended a full lifting of the boil water alert.

- At 11.30 am Minister Knowles announces all suburbs cleared.

5 August 1998

- SWC rescinds “emergency notice” on AWS.

H

Joint chronology agreed between Sydney Water and, NSW Health

Wednesday 15 July

Normal monitoring/routine sampling of water treatment system by swc.

Tuesday 21 July

- SWC initiates incident management process following positive result from sample taken on 15/7/98 showing low level *Cryptosporidium* and *Giardia* at outlet to Prospect plant and outlet to Potts Hill reservoir.
- NSW Health, Environment Health Branch, received a call (am) from Sydney Water reporting positive testing of Potts Hill (2C/2G) and Prospect (0C/3G) (sampling had been done on 15 July). Consequently, further sampling and testing was being done downstream from the reservoirs.
- SWC orders retesting of the positive sites and other testing throughout the Potts Hill system and the outlet of the Prospect plant. This is normal SWC practice agreed to by NSW Health.
- SWC reviews Prospect plant records for 15/7/98 and finds them within specification

Wednesday 22 July

- SWC test results for 21/7/98 samples all clear except for garden tap in grounds of Sydney hospital.
- Sydney Water rang NSW Health, Environment Health Branch (pm) advising testing of the City reticulation system had found 1*Giardia/100* litres and SWC was flushing the mains and retesting).
- SWC reorder testing local to Sydney Hospital and upstream, including inlet of Potts Hill. Flushing the local system. Taking further samples for testing. NSW Health concurred.

Thursday 23 July pm

- SWC receives test results for *2217/98.*
- SWC notified NSW Health that no *Cryptosporidium* and no *Giardia* were found in samples from Elizabeth Bay, the Rocks, Waterloo, and Centennial Park and Potts Hill inlet. However, at Macquarie Street / Sydney Hospital had detected 43 *Cryptosporidium* and 19 *Giardia* per 100 Litres. Sydney Water suspected that this had occurred as a result of a cross-connection within the hospital grounds. Consequently SWC advised NSW Health that a meeting was required and Health provided relevant contact details for the hospital.
- Meeting convened between Sydney Hospital engineers and SWC in an attempt to find a potential source of cross-contamination. SWC talks to hospital engineer and hospital administration about cross-connection as source of possible contamination and recommends water storage tank be emptied.
- SWC takes more samples from the area downstream from Potts Hill, testing for *Cryptosporidium* and *Giardia.* NSW Health also asked SWC to measure other parameters such as faecal coliforms, heterotrophic plate counts, and chlorine levels. This was already under way by SWC.

Friday 24 July

- SWC reviews further data from Prospect plant which indicates the plant is operating within contract specifications.
- SWC discusses problem and precautions with Sydney Hospital again and suggests again that it drain its storage tank. Sydney Hospital agreed and took action.
- SWC undertakes re-sampling and water flushing in College Street and Crown Street areas.
- SWC obtains further tests results in vicinity of Sydney Hospital. All results are negative except for Sydney Hospital and the Art Gallery which have the same water supply.
- SWC notified NSW Health: Sampling of the level of the Art Gallery-Domain had detected 16 *Cryptosporidium/* 16 *Giardia* and Sydney Hospital result 1C 0G; all other results outside the Eastern CBD were negative and more results were pending. SWC was looking for potential cross contamination in the Eastern CBD

Saturday 25 July

- SWC's sample results of tests performed on *2417/98* show negative for some sites and significant increase for others.
- NSW Health received a call at 6.35pm from Sydney Water who reported that testing of first flush water from the following locations had detected:

Macquarie St (near Sydney Hospital)	161 *Giardia*	15 *Cryptosporidium*
near the Art Gallery	106 *Giardia*	10 *Cryptosporidium*
Hospital road	0 *Giardia*	0 *Cryptosporidium*
Liverpool St and Hyde Park	0 *Giardia*	0 *Cryptosporidium*
Crown St. pumping station	5 *Giardia*	10 *Cryptosporidium*

Sydney Water suggested that a possible explanation was that cysts that naturally collect over years in the biofilm lining the water pipes had been released by a combination of high chlorine levels, and the sudden flushing of the pipes in the sampling process. Dead ends were considered a possible factor.

- Sydney Water agreed with Health that it would search for possible local causes of contamination, but none were identified.
- Crown Street pumping station results are positive and SWC orders a physical check of Crown Street reservoir but nothing unusual is detected.
- NSW Health received a call from SWC at 7.50 pm who reported that testing of first flush water from College St had detected 461 *Giardia* and 104 *Cryptosporidium* cysts. The sample, however, was hard to process. Sydney Water advised that another possible cause was local contamination resulting from a backflow.
- SWC and Health agree that SWC will seek independent validation of the test results from Macquarie University due to the magnitude of the readings.
- SWC commences and expands retesting program.
- SWC orders testing relevant to distribution of water to the Northern Suburbs of Sydney.

Sunday 26 July

- SWC undertakes systematic scouring and flushing program for the Crown Street reservoir affected zone. SWC undertakes a visual inspection of Potts Hill reservoir.

- Macquarie University experts do "blind" review of Ensight test slides and the counts for *Cryptosporidium* and *Giardia* were validated, however the attempts to do speciation and viability were not successful.

- SWC receives test results from 25/7/98. High levels in Crown Street system identified. SWC orders and implements further analysis of test results and sampling. SWC reviews chlorine levels in the water system and they are acceptable. SWC receives test results for system delivering to the Northern Suburbs. Results are clear. SWC receives one small reading upstream of the Crown Street reservoir. SWC reviews dirty water complaints received by its call centre and none are reported for the Eastern CBD.

- NSW Health received a call from Sydney Water who reported that testing of water from the following locations had detected:

Macquarie St:	3952 *Giardia*	376 *Cryptosporidium*
Museum	332 *Giardia*	170 *Cryptosporidium*
Art gallery	*963 Giardia*	200 *Cryptosporidium*
Crown St	*20 Giardia*	6 *Cryptosporidium*
Pressure tunnel	*0 Giardia*	0 *Cryptosporidium*
City Tunnel	*8 Giardia*	0 *Cryptosporidium*

The cause of these findings was unclear, but possible explanations to Health by SWC included release of organisms from biofilms, or localised contamination from a backflow.

SWC reported to Health they were continuing to flush the water system to remove possible contamination.

SWC continued to advise Health that these levels may represent a build up of low levels of organisms in the biofilm inside the pipe released while flushing occurred.

- SWC undertakes widespread flushing and testing for affected area and surrounding sites including tests beyond those for *Cryptosporidium* and *Giardia.* SWC undertakes scouring late into the evening and scours left open all night. Testing is carried out with the scouring. SWC incident management team continues investigation into possible causes/sources of contamination. Health concurred with these actions.

Monday 27 July

- SWC reviews operations records of Prospect water filtration plant. SWC orders samples to be taken from Potts Hill reservoir. SWC report new evidence that the source of organisms was now likely to be a local inflow of untreated water due to negative pressure in the pipes related to nearby construction that allowed material around the pipes, that could include faecally contaminated water, to be drawn in.
- SWC provides latest test results to include:

Liverpool and Crown street	1 *Cryptosporidium*	16 *Giardia* (pre flush)
Thornleigh	0	0
West Ryde	0	0

- SWC advises NSW Health that contamination may have been caused by a negative pressure event in the effected areas.
- NSW Health convened a teleconference between 11 :45 am -1: 15 pm of Sydney Water and experts in water testing, infectious diseases and public health.

Summary of teleconference. The findings to date, possible explanations and corrective action taken by SWC were discussed. SWC suggested that a likely explanation for the contamination was localised episodes of negative pressure which allowed entry of untreated water into the system. The samples tested to date supported the theory that an ingress of untreated water had occurred. Concern was expressed for residents and people commuting to the affected area and especially for the immunocompromised. The teleconference agreed that there was a need for a public health warning and the issuing of a 'boil water' advice.

The meeting agreed that Sydney Water should urgently:

- release a press statement warning persons in the affected area of the eastern Central Business District not to drink unboiled water the text of which , would be agreed between SWC and NSW Health and released in time to , make the evening TV news

- continue the search for a possible source of contamination
- continue flushing of the system
- personally warn customers in the affected area that day, including building owners/operators
- additional testing of affected area
- set up a hotline.

Discussion followed about lifting the 'boil water' advice. SWC agreed to continue to investigate the extent of contamination. The 'boil water advice' would be lifted if further investigation showed that the contamination did not extend beyond the area currently affected and that testing of samples were negative on three consecutive occasions. SWC media and Health media were to liaise on the media release.

Health Version of events of Monday afternoon

1. At 2pm Ms Armistead NSW Health media contacted Rod Metcalfe SWC media regarding the proposed media release. It was agreed:
    - that the release should contain a warning message to boil Water for one minute before drinking
    - a warning to seek medical advice should be given if people had any symptoms.
    - NSW Health fact sheets on *Cryptosporidium* and *Giardia* would be distributed with the media release.
    - NSW Health fact sheets for both the general public and specifically for immunosuppressed people were faxed to SWC.
2. At 3pm Ms Armistead contacted Rod Metcalfe regarding the media release and was advised it was still being worked on. Mr Metcalfe agreed to send the release to NSW Health to check when ready.
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SWC Version of events of Monday Afternoon

1. SWC recommended a media conference for 3.30 pm, which was rejected by Ms Am1istead who stated it would make it a bigger issue than it was.
2. The DG of Health contacted the MD SWC and reiterated that he did not support a press conference and that if SWC held a press conference Health would not take part.
3. A first draft press release was faxed to Ms Am1istead at Health media prior to 3.30pm.
4. At 4pm Ms Am1istead contacted Mr Metcalfe and advised of requested changes including removal of any Health statement of support for SWC actions.
5. A final press release occurred at approximately 5.30pm. A copy was faxed to Health at approximately 6.15pm.

- NSW Health begins to receive media calls requesting information on *Cryptosporidium* and *Giardia.* NSW sent out its fact sheets to media. NSW Health provides advice to the media.

- Prior to releasing the press release SWC prepared an infom1ation pack for all call centres and customer centres and organised a 1800 number with Telstra. The information pack contained the release, background information, questions and answers about *Cryptosporidium* and *Giardia* and advice on boiling water. Call centres were fully briefed.

- SWC also began to receive media calls and hotline calls.

- SWC receives test results of sites sampled in Crown system on 26/7/98 which all returned clear. SWC orders confirming tests for the Crown Street system. SWC commences to contact all affected customers. SWC converts media release to a letter for postal drop on 28/7/98 and 1800 number operations established.

- At 4.05 pm SWC provides latest test results to NSW Health as follows:

Macquarie St	0 *Giardia*	0 *Cryptosporidium*
Art gallery	*0 Giardia*	0 *Cryptosporidium*

- At 6.32pm SWC provides further results to NSW Health as follows:

College St	0 *Giardia*	0 *Cryptosporidium*
City Tunnel (Greenacre)	0 *Giardia*	0 *Cryptosporidium*
Crown Street Reservoir	0 *Giardia*	0 *Cryptosporidium*

- At 9.55pm SWC advises NSW Health that Rockdale and Waterloo pumping stations were all clear.
- SWC considered that the clear result in the city further supported the theory of local contamination which had now been cleared. SWC ordered further tests to confirm this.
- SWC were notified in the early evening of a 300mm main break in Oxford Street. SWC inspects and considers whether this was the cause of the contamination but, rejects this proposition due to nature of cracking of pipe.

Tuesday, 28 July

- SWC completes letter box drop to all customers in Eastem CBO area.
- SWC receives very low results in Rhodes. SWC orders visual inspections and testing of suction well site (source of Rhodes supply). Rhodes system flushed as a precautionary measure. SWC takes further samples throughout the system up to Potts Hill. SWC receives results for samples taken on 27/7/98. Low positive results in Macquarie Street, College Street and at Crown Street reservoir. SWC decides to drain Crown Street reservoir.
- NSW Health prepares statement for the Sydney Morning Herald.
- From 2.55pm SWC informed NSW Health of the following results:

Art Gallery	0 *Cryptosporidium*	0 *Giardia*
Sydney Hospital Tank	0 *Cryptosporidium*	0 *Giardia*
College Street	4 *Cryptosporidium*	6 *Giardia*
Macquarie Street	2 *Cryptosporidium*	1 *Giardia*

At 8.45pm SWC informs Health of Rhodes retesting results: 0C 0G

From about 9.20 prn SWC advised NSW Health of the following results

Darling Point	0 *Cryptosporidium*	0 *Giardia*
Dover Heights	0 *Cryptosporidium*	0 *Giardia*
Shaft 3	0 *Cryptosporidium*	0 *Giardia*
Shaft 17	0 *Cryptosporidium*	0 *Giardia*
Albert St	0 *Cryptosporidium*	0 *Giardia*
Prospect WTP	0 *Cryptosporidium*	0 *Giardia*
Crown St Reservoir	*0 Cryptosporidium*	14 *Giardia*

Wednesday 29 July

- At 10.30am SWC faxes Health a summary of available test results.
- SWC receives a report on Prospect turbidity and plant maintenance.
- At 12.45pm Ms Armistead, NSW Health media phoned Mr Metcalfe SWC media to advise that an updated local boil water advice would probably be called for at a forthcoming meeting between SWC and NSW Health. Ms Armistead asked Mr Metcalfe to prepare a 'boil water'' advice in anticipation of the request to ensure that any time extension of the advice went out promptly. Mr Metcalfe indicated he would await the advice of the meeting.
- At 1.30pm meeting held between SWC and NSW Health where:
    - it was decided to continue the 'boil water' advice for eastern CBD
    - results of sampling done on 26 and 27 July were encouraging with no ii, *Cryptosporidium/no Giardia* detected in various samples in the eastern CBD area (Macquarie St, College St, Main City Tunnel, Crown Street Reservoir, Art Gallery); only one sample was positive for *Giardia* (4/100 litres taken at Llewellyn St)
    - and the meeting concluded at approximately 2.45pm

NSW Health considered the outcome of the meeting was that SWC would issue a media release the text of which would be agreed between Health and SWC. SWC considered the outcome of the meeting was that it would place an advertisement in the next day's papers and letter drop all affected customers.

- At 3.40pm Ms Armistead, NSW Health media contacts Mr Metcalfe SWC media, regarding the issuing of a local 'boil water' advice for an extended period. Mr Metcalfe advised that SWC would prefer to place another advertisement in the newspapers as they had done that day. Ms Armistead advised that Health would prefer the wider circulation of a media release. Health media confirmed with Dr Jeremy McAnulty that NSW Health would prefer a media release.

- Between 3.40pm and 4.25pm a draft media release was discussed between SWC media and NSW Health media with Health requesting substantial amendment.
- At 5pm Ms Armistead, Health media contacted Mr Michael Reid Director General requesting he contact the MD SWC to ensure the updated local 'boil water' advice was put out.
- DG Health contacts MD SWC advising that SWC issue updated local 'boil water' advice as soon as possible.
- DG Health phoned Minister Refshauge's office to contact Minister Knowles' office to ensure updated local 'boil water' advice was issued by SWC as soon as possible.
- SWC issues updated media release at about 5.45 pm. SWC contacts and discusses release with all major metropolitan media outlets. In addition SWC it continues advertisements in the Sydney Moming Herald and Daily Telegraph (for the 30/7/98)
- At 6.25pm Health receives media release from SWC on updated local 'boil water' advice.
- Early evening SWC receives positive result from sample of sediment taken in Prospect CWT1 on 28/7/98 (which was offline for maintenance). SWC receives Potts Hill reservoir positive result later that night. SWC receives Enfield Shaft 6 positive result later again. SWC orders upper canal inlet to Prospect filtration plant closed as a precautionary measure. SWC makes arrangements to deliver crane to site, should it be necessary to by-pass the Prospect filtration plant. SWC orders Warragamba inlets, system extremities and Prospect CWT2 to be sampled in addition to other sampling of the system.
- SWC and AWS liaise to modify operation of plant eg more frequent backwashing, maintaining constant flow through the filters (effectively bypassing the Clear Water Tank 2) and increased upstream chlorination.
- SWC decides to flush city again from Crown Street downstream.

NOTE: NSW Health and SWC have provided separate detailed accounts of the events of the evening of Wednesday 29 July 1998. Health commences from 9.30pm. SWC commences from approximately 8pm.

Thursday 30 July

- SWC provides a summary of current test results from *2917/98* to Health as they came to hand.

Potts Hill site2	0 *Cryptosporidium*	0 *Giardia*
Potts Hill site 3	*0*	*0*
Suction Well	*2*	*5*

Suction Well (retest)	*0*	*0*
Prospect Plant	*0*	*0*
Crown Street	*1*	*1*
Art Gallery	*4*	*0*
College Street	*2*	*0*
Macquarie Street	*1*	*0*
Potts Hill site1	*10*	*48*
Potts Hill site 4	*6*	0
Pressure tunnel (Enfield)	12	136
City tunnel	24	27

- SWC commences inspection of upper canal. SWC switches Sutherland Shire from Prospect to Woronora. Prospect flow reduced to a minimum.
- SWC meets with AWS to discuss actions taken. Possibility of flushing backwash from the Prospect plant into Prospect reservoir canvassed.
- SWC seeks technical experts to assist in call centre operations to manage customer enquiries. SWC accelerates sampling of Prospect plant.
- SWC seeks permission from EPA to divert backwash into Prospect reservoir. EPA advises it would not prosecute in the event of such diversion. SWC diverts Prospect plant backwash to avoid protozoa concentration. SWC inspects sediment of CWT1 at Prospect plant. SWC analyses how to minimise water flow through Prospect plant and devises plan accordingly. SWC undertakes further review of chlorine ratios.
- At 3.45pm SWC receives Warragamba pipeline #1 results: 0 Cryptospiridium 0 *Giardia.* SWC receives positive results at the filtration plant. At 4pm SWC decides to by-pass the Prospect filtration plant to bring clean, chlorinated Warragamba Dam water to the system.
- At 4pm meeting held between officials of SWC, Health and Premier's Department.
- SWC receives significant high results at the Prospect plant from 29/7/98 samples.
- At 4.30pm meeting held with Premier, Minister Knowles, SWC and Health officials. Decision made at meeting to extend 'boil water' advice to all of Sydney. Positive results at Palm Beach from samples taken on 29/7/98 received during the meeting.
- At about 5.15 Premier's and Minister Knowles' staff draft press release in consultation with SWC and Health. Media release issued by SWC extending 'boil water' advice to all of Sydney.
- SWC commences to phone major affected organisations such as councils, schools and hospitals.
- SWC commences planning for by-pass and issues "emergency notice" to AWS.
- SWC becomes aware that operational difficulties make it impossible to by-pass the Prospect plant unless a CWT could be used to balance the pressure in the system. SWC continues to work on these difficulties to effect the bypass.
- SWC receives positive reading on Warragamba #2 pipeline outlet and decides to close Warragamba #2 pipeline. SWC orders further sampling of Prospect

CWT2. Approximately 30 samples are ordered across the system. SWC moves Warragamba Dam offtake screens to improve water quality and closes Warragamba #2 pipeline.

- Chief Health Officer contacted by Sydney Water confirming that they had extended the boil water advice to most of Sydney.

Friday 31 July

- From 1 am SWC begins refilling Prospect CWT1 as part of the by-pass process. SWC receives Prospect filtration plant distribution chamber test result: 0 *Cryptosporidium* 0 *Giardia;* Warragamba#2 result 0 *Cryptosporidium* 0 *Giardia.* SWC reopens Warragamba 2 pipeline after recommissioning the chlorine plant at the upstream end of the pipeline.
- SWC devises protocols for purging the system once it is given the all clear including the list of reservoirs that can be isolated. SWC devises work plans for cleansing each delivery system. SWC advises all systems managers to scour and flush all reservoirs. Preparatory work on Prospect by-pass continues. Further samples taken at Warragamba.
- Meeting between Health and SWC held. Health advises expert panel is to be convened that evening. SWC provides updated test results from 30/7/98 to Health including:

Prospect Plant Outlet	*765Cryptosporidium*	*230Giardia*
Palm Beach	*365*	*151*
Warragamba#1	*0*	0
Warragamba #2	*0*	*0*

- Meeting between Minister Knowles, AWS and the MD SWC to discuss Prospect by-pass.

- Minister Knowles announces establishment of expert panel.

Composition of Expert Panel:

Professor Syd Bell	Executive Medical Director South Eastern Area Laboratory Services
Professor Tania Sorrell	Professor Infectious Diseases and Microbiology

Dr John Walker	Head of Parasitology
Dr Duncan Veal	Senior Lecturer Biological Sciences, Macquarie University
Professor Lyn Gilbert	Director CIDM Laboratory Services

A sub-group of the expert panel met with SWC officers at Sydney Water at 5.30pm. The expert panel requested that a turbidity monitoring alarm be set at 5NTU for the inlet water to the Prospect Reservoir. The expert panel agreed on the following criteria for the 'clearance' of treated water from Prospect:

- at least 3 negative 100L tests for *Cryptosporidium* and *Giardia* over 36 hours with a test recovery efficiency of 50%. The first negative test in this sequence being 0C 0G at Prospect plant was taken at around 2100 hours on Thursday 30 July 1998.

- the panel required continuing clear sampling of at least 2 samples every 24 hours.

- In addition any turbidity above 5NTU at the inlet will require an additional sample.

The expert panel and Sydney Water agreed that should testing overnight continue negative, then fluoridation at Prospect be turned off no earlier than 0900 hours on 1 August 1998 to create a possible marker of clean water moving through the system.

It was agreed that 'clearance' of the remaining system would require testing of representative sites, spaced over time.

Saturday 1 August

- SWC begins major cleaning program. Reservoirs begin to be isolated. Fluoride turned off at plant. Mains flushed -system purged by pulling fresh water through as quickly as possible. This process continues until 4/8/98.
- SWC tests to detect fluoride trace in system and comparison with computer modelling to determine travel times for clear water and to assist expert panel to decide when to declare areas safe.

Expert Panel Teleconference 11 am (NSW Health and Expert group)

The full panel reviewed the sub-group's deliberations and it was agreed that any *Cryptosporidium* oocysts detected for viability and species using an experimental technique. The panel agreed to meet to consider any test results for *Cryptosporidium* of greater than 10/100 I. The expert panel signs off on SWC's revised protocol.

- Minister Knowles meets with expert panel prior to press conference.
- At press conference Minister Knowles releases media release estimating 6 -8 days for complete cleansing.
- Immediately after the press conference Minister Knowles, SWC and NSW Health met with the expert panel. SWC were advised of the revised clearance protocol.
- SWC sends slide samples to Thames Water, London for independent assessment of presence of *Cryptosporidium* and *Giardia.*
- At 6.20 pm CHO confirms the expert panel had advised that the Prospect Plant had met the criteria for clean water.

Expert Panel Teleconference 10 pm.

At 10pm SWC presents its results to the expert panel in teleconference. SWC then left teleconference leaving expert groups to discuss the results.

The expert panel noted that '10 x 10L' samples from Prospect South had been completed and a 0/0 result had been reported for *Giardia* and *Cryptosporidium.* The panel also noted that no evidence of clearance of the fluoride marker from the zone was available. The panel declined to declare Prospect South clear.

The panel resolved that the fluoride marker was at this time a necessary criterion for clearance of a zone or part of a zone. In the case where the fluoride marker evidence could not be provided, the expert panel would have to consider these on a case by case basis. Urgent advice should be provided of such cases where fluoride marker evidence in unavailable.

Where a zone or a part of a zone has satisfied the criteria the committee resolved that Dr Andrew Wilson would have executive power to authorise the announcement of a lifting of the boil water alert for that zone or part zone. In such cases, advice of the fluoride concentration and '10 x 10 L' test results would be forwarded by fax to Dr Wilson for authorisation.

Sunday 2 August

- Expert retained by SWC arrives from the USA.
- At 11 am a teleconference is held between SWC and the expert panel. ~

Expert Panel Teleconference 11 am.

The panel noted advice from SWC that monitoring of clean water flow using fluoride as a marker had proved technically difficult due to residual fluoride in the system and background fluoride.

The expert panel agreed to revise their criteria for clearance of an area to the following: where an area is proximal to the Prospect treatment facility and water flows through it into another area, the proximal area will be clear when it tests negative for *Giardia* and *Cryptosporidium* by the '10 x10 L' method and the downstream area also has a negative '10 x 10 L', as well as the proximal area having had 24 hours of clean water flowing through it, as calculated by the hydrology from 2100 hrs on 30 August 1998.

The panel agreed that any positive result for *Cryptosporidium* should lead to testing of that sample for species and viability.

The panel requested that Sydney Water implement a prospective monitoring alarm on turbidity of treated water leaving the Prospect plant of 0.1 NTU.

In regard to the affected suburbs in the Sutherland Shire, the expert panel agreed that there was compelling evidence from analysis of water hardness characteristics to conclude that the water previously sourced from Prospect for that area had been flushed from the system since the switch over to the Woronora supply at 0800 hours on 30/7/98. In addition, Sutherland Shire tested negative on a "10 x 10" for g and c. On this basis, and subject to written confirmation of previous negative background tests for g and c at Woronora dam from May 1998 to the present, the expert panel agreed to recommend the authorisation of Sutherland Shire to be announced as clear.

- Teleconference held with Minister Knowles, SWC and Health.
- SWC identifies postcode areas to be released from 'boil water' advice and these are sent to Minister Knowles' office. Minister Knowles releases first areas accordingly and process continues continually until all of Sydney is cleared on 4/8/98.

- Meeting between SWC, Minister Knowles and his staff. Minister Knowles informed of unconfirmed positive test for *Cryptosporidium* and *Giardia* in Illawarra. SWC advises Health of Illawarra result. Illawarra sample is retested and is clear.
- Colin Fricker independent expert from Thames Water arrives. ~ Suburb by suburb clearance continues.

3 August 1998

- Thames Water report to SWC confirms validity of Ensight results.
- Discussion between SWC and Health regarding test protocol following criteria set by expert panel.
- Suburb by suburb clearance continues.

4 August 1998

- Tony Myers, water treatment expert from the USA retained by SWC arrives.
- At 9am a teleconference is held with the expert panel.

Expert Panel Teleconference 9 am

The panel noted data from Sydney Water that indicated that 90% of Sydney Water had tested clear by the '10 x 10 L' criterion and that negative '10 x 10 L' tests had been recorded along the extreme distal arms of the system. Since proximal areas were all clear and distal testing was also clear, the panel agreed to lift the 24 hour flow criterion for the outlying zones and recommended a full lifting of the boil water alert.

- At 11.30 am Minister Knowles announces all suburbs cleared.

5 August 1998

- SWC rescinds "emergency notice" on AWS.

A Statement from NSW Health for Sydney Morning Herald **28th July 1998**

Over the past year NSW Health has conducted intense active surveillance for evidence of disease which could be attributed to cryptosporidium in drinking water. So far no disease has been detected.

During the weekend NSW Health carefully monitored reports of water testing from Sydney Water.

On Monday new evidence came to light showing the source of the organisms was possibly due to a problem with the pipes that allowed contaminated water to be sucked in.

It was at that point it was decided a warning should be issued as a precaution.

No relationship has been established between finding cryptosporidium in drinking water at any level (in Australia or elsewhere) and effects on human health.

That means a high level versus a low level does not necessarily indicate an increased risk.

This is also supported by a large survey of treated North American water supplies which showed that despite the presence of cryptosporidium there was no evidence of human disease.

The lack of association between cryptosporidium in drinking water and human illness may be because the organisms are killed during water treatment processes.

Two-day silence on tainted city water

By LINDA DOHERTY

Health and water authorities waited two days before making public that high levels of potentially fatal Cryptosporidium and giardia parasites had contaminated city drinking water.

Sydney Water issued a news release at 5 pm on Monday warning city residents within a two-kilometre radius of College Street to boil water for at least a minute before using it.

But staff first detected low levels of the parasites in a water main near Parliament House in Macquarie Street on Friday.

On Saturday, high levels of both parasites – which can cause gastro-intestinal illness in healthy people and have fatal consequences for babies, the elderly and people with AIDS – were found in Macquarie and College street mains.

Sydney Water and NSW Health did not meet to discuss notifying the public until Monday.

The Opposition Leader, Mr Collins, said the "unprecedented crisis" risked Sydney's clean water reputation two years before the Olympics.

"The real question is why it took the Government two days to release this information," he said.

A Sydney Water spokesman said it could be another day before the contamination source was identified, but it was thought to be stormwater which seeped into the mains after construction work disturbed soil.

The chairman of Water Consumers of Australia, Mr John Archer, said Sydney Water had acted "disgracefully" by not informing the public of the potentially fatal risks of infection, especially to people with depressed immune systems.

"In America this would not be tolerated," Mr Archer said. "President Clinton recently identified Cryptosporidium contamination as a very serious problem.

"Sydney Water is deliberately downplaying the risks."

Cryptosporidium and giardia are naturally occurring parasites found in human and animal intestines. Illnesses such as diarrhoea are caused when the organisms are ingested.

The giardia levels found on Saturday were 200 to 300 cysts of the parasite per 100 litres of water, while the Cryptosporidium readings were just under 20 oocysts per 100 litres. Normal levels for both parasites are zero. Three high-level readings were registered at the two sites over the weekend.

The area affected was bounded by Crown, Elizabeth, and Campbell streets and the Royal Botanic Gardens.

The Sydney Water spokesman said pipes in the area were flushed and by Monday the parasite readings were zero.

Testing took 24 hours and there was no "real time" test in Australia to speed up the process, he said.

A NSW Health spokeswoman said no illnesses had been reported and the precautionary warning was issued on Monday when the test results were available.

"On Monday, new evidence came to light showing the source of the organisms was possibly due to a problem with the pipes that allowed contaminated water to be sucked in," she said.

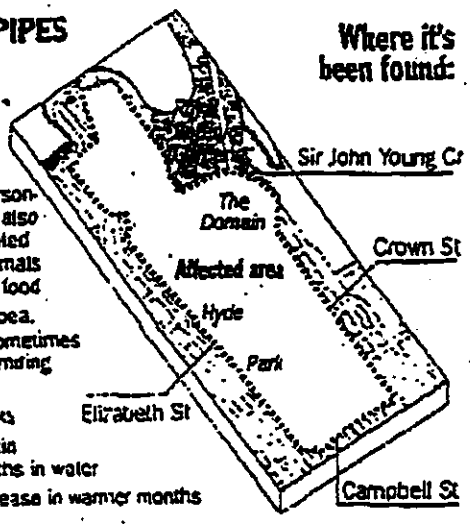
"No relationship has been established between finding Cryptosporidium in drinking water at any level, in Australia or elsewhere, and effects on human health."

A senior lecturer in biological sciences at Macquarie University, Dr Duncan Veal, said the readings were "unusual and highly undesirable to find in finished (treated) water".

Seven Sydney pools were temporarily closed after the chlorine-resistant parasite was detected in March.

PERIL IN THE PIPES

- Cause *Cryptosporidium*, a parasite which infects intestines
- Transmission Mostly through person-to-person contact, also through contaminated water, infected animals and in rare cases, food
- Symptoms Diarrhoea, abdominal pain, sometimes slight fever and vomiting
- Recovery Usually less than two weeks
- Parasite may remain infectious for months in water
- Cases tend to increase in warmer months



Source: Sydney Morning Herald, 29/7/98

~~Indications are that the source of the giardia is Botany~~ is from

29 July 1998

~~URGENT~~ PUBLIC ANNOUNCEMENT

(1) Extensive testing by Sydney Water Corporation has identified the presence of the microorganism~~s~~ Giardia ~~and Cryptosporidium~~ in parts of Sydney's water supply.

A batch of water containing ~~these~~ the organism~~s~~ in the Eastern Sydney CBD was identified late last week.

A second batch has now been identified ~~which could affect a much wider area.~~ which could affect

~~In conjunction with NSW Health, Sydney Water is issuing this precautionary alert for all areas of Sydney - excluding Penrith, the Blue Mountains, Campbelltown, Richmond and the Illawarra.~~

Residents of the affected area are advised to boil drinking water for one minute and allow it to cool naturally before drinking. (2)

Normal hot water can be used for bathing, dishwashing and cleaning cooking utensils b~~ut cold rinse should be avoided. These should be dried. Ice should be made from boiled water.~~

~~Sydney Water believes it has identified the source of the contamination and is working to rectify the city's water supply as quickly as possible.~~

~~The microorganisms can cause severe diarrhoea. People concerned should seek professional medical advice.~~

The giardia can cause stomach upset and may require seeking profess. medical advice.

Sydney Water will ~~keep the community informed through the media~~ continue monitoring & testing throughout the metrop area

The Sydney Water Hotline is available: 1800 644 522 (24 hours)

Media Information Rod Metcalfe/Colin Judge
02-9350-5940/029350-5151
Pager 02 -9966-7941

Head Office

115–123 Bathurst Street, Sydney, NSW 2000, Australia PO Box A53, Sydney South, NSW 2000, Australia

Phone (02) 350 6969 DX 14 Sydney

SYDNEY WATER CORPORATION LIMITED

Sydney
WATER

29 July 1998

PUBLIC ANNOUNCEMENT

Extensive testing by Sydney Water Corporation has identified the presence of the microorganism Giardia in parts of Sydney's water supply.

A batch of water containing the organism in the Eastern Sydney CBD was identified late last week.

A second batch has now been identified which could affect an area East of Bankstown - Silverwater; South of the Harbour and North of the Georges River.

Residents of the affected area are advised to boil drinking water for one minute and allow it to cool naturally before drinking.

Sydney Water will advise as soon as the water supply is clear and further precautions become unnecessary.

Normal hot water can be used for bathing, dishwashing and cleaning cooking utensiles.

Gardia can cause stomach upsets and may require seeking professional medical advice.

Sydney Water will continue monitoring and testing throughout the metropolitan area.

The Sydney Water Hotline is available: 1800 644 522 (24 hours)

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SYDNEY WATER CORPORATION LIMITED ACN 063 279 649

Sydney
WATER

30 July 1998

SOURCE OF CONTAMINATION CONFIRMED

The source of the organisms found in Sydney's water supply has been identified and action is now taking place to control the presence of Giardia and Cryptosporidium.

The Managing Director of Sydney Water, Mr Chris Pollett, said tonight the outlet at the Prospect Water Treatment Plant has been shut off and water for Sydney was being drawn and disinfected from Warragamba Dam so that water to Sydney will completely bypass the Prospect Water Filtration Plant.

Mr Pollett said that results of testing undertaken today and completed this evening indicated a Giardia presence at Palm Beach. Water supply leading to this area had previously tested clear of both organisms.

Mr Pollett said that having now found the source of contamination and received further results of testing, Sydney Water and NSW Health had decided that all Sydneysiders should boil tap water for one minute prior to drinking.

This is expected to be for a period of approximately 48 hours. Continuous testing will take place until an all-clear can be given.

Residents of the Blue Mountains, Penrith, Richmond/Windsor, Campbelltown and the Illawarra are not affected as their water does not travel through Prospect.

Schools, hospitals, nursing homes and child care centres that were not in the previous identified area are tonight being notified of this city-wide alert.

The Director of Education, Dr Ken Boston, has asked parents that their children take their own drinks to school tomorrow.

The Prospect Plant and its downstream pipes are now being treated to clear Giardia and Crypto organisms.

An intensive audit of the plant and its treatment and monitoring systems is now underway. The results will be released publicly and sent to the independent inquiry announced by the Premier today.

Sydney Water and NSW Health have released the following information:

- Boil water for at least one minute on a rolling boil. For automatic shut-off kettles the button should be held down for at least one minute
- Boiled water should be left to cool then put in the fridge in a clean container with a lid

Head Office

115–123 Bathurst Street, Sydney, NSW 2000, Australia PO Box A53, Sydney South, NSW 2000, Australia

Phone (02) 350 6969 DX 14 Sydney

SYDNEY WATER CORPORATION LIMITED ACN 063 279 649

- Boiled water should be used for drinking, cooking, making ice, personal hygiene, pets' drinking water and where there is a risk of ingestion for:
    - washing hands
    - cleaning teeth
    - gargling
    - with small children - face washing
    - wash toys and children's utensils.

A customer hotline is available on 1800 644 522

news release

NEW SOUTH WALES

Minister for Urban Affairs and Planning
Minister for Housing

30 July 1998

ACTION TAKEN TO MAKE DRINKING WATER SAFE

Sydney Water has taken immediate action to make drinking water safe for residents who could potentially be affected by the presence of the microorganism Giardia in parts of Sydney's water supply.

The Minister for Urban Affairs and Planning, Mr Craig Knowles, said the problem is believed to be related to a water source coming down the Upper Canal to the Prospect Treatment Plant.

Mr Knowles said the following action has been taken to protect the public:

- the Upper Canal has been turned off to isolate it from Sydney's water supply;
- chlorine levels have been increased throughout Sydney's water system to help kill off any traces of Giardia;
- only Warragamba water is arriving at the Prospect Treatment Plant;
- all schools, hospitals, nursing homes, community health centres and dental hospitals in the affected area have been notified and advised to boil all water for at least one minute before drinking.

Sydney Water detected the batch of Giardia around 9pm last night and immediately notified health authorities. A public health announcement was released soon after and testing was continued.

Testing and monitoring is also continuing to be conducted thoughout Sydney's water system.

The Managing Director of Sydney Water, Mr Chris Pollett, said preliminary testing had shown traces of Giardia in the system between Prospect Filtration Plant and the city, but that detailed test results were not yet available.

He said Sydney Water had released a list of all affected suburbs to media and community outlets will continue to keep the public updated on testing procedures and will advise immediately the water supply is clear.

Further information: **Helen Willoughby 9228 4499; 0419 239 178**

Affected Suburbs (the suburbs in this list include the variations of North, South, East, West, Bay, Heights etc)

Abbotsford
Alexandria
Allawah
Annandale
Arncliffe
Ashbury
Ashfield
Auburn
Balmain
Banksia
Banksmeadow
Bankstown
Bardwell Park
Beaconsfield
Belfield
Bellevue Hill
Belmore
Beverley Hills
Beverley Park
Bexley
Birchgrove
Blakehurst
Bondi
Bondi Junction
Botany
Brighton le Sands
Bronte
Burwood
Cabarita
Camperdown
Campsie
Canada Bay
Canterbury
Carlton
Carss Park

Centennial Park
Chifley
Chippendale
Chiswick
Chullora
City of Sydney
Clovelly
Concord
Connells Point
Coogee
Croydon
Croydon Park
Daceyville

Darling Point
Darlington
Darlinghurst
Dawes Point
Diamond Bay
Dolls Point
Double Bay
Dover Heights
Drummoyne
Dulwich Hill
Earlwood
Eastlakes
Edgecliff
Elizabeth Bay
Enfield
Enmore
Erskineville
Five Dock
Flemington
Forest Lodge
Glebe
Greenacre
Haberfield
Hillsdale
Homebush
Hurlstone Park
Hurstville
Kensington
Kings Cross
Kingsford
Kingsgrove
Kogarah
Kyeemagh
Kyle Bay
La Perouse
Lakemba
Leichhardt
Lewisham
Lidcombe

Lilyfield
Little Bay
Lugarno
MacDonaldtown
Malabar
Maroubra
Marrickville
Mascot
Matraville
Millers Point
Mortdale
Mortlake
Mt Lewis
Narwee
Newtown
Oatley
Penshurst
Monterey
Paddington
Padstow
Pagewood
Peakhurst
Petersham
Phillip Bay
Point Piper
Port Botany
Potts Point
Punchbowl
Pyrmont
Ramsgate
Randwick
Redfern
Revesby
Rhodes
Riverwood
Rockdale
Rodd Point
Rookwood
Rose Bay
Rosebury
Rozelle
Rushcutters Bay
Russell Lea
Sandringham
Sans Souci
Silverwater
St Peters
Stanmore
Strathfield
Summer Hill
Surry Hills
Sutherland
Sydenham
Tamarama
Tempe
The Rocks
Turrella
Ultimo
Undercliffe
Vaucluse
Woollahra
Waterloo
Watsons Bay
Waverley
Wiley Park
Woolloomooloo

Zetland

Below is a list of Local Government Areas where the presence of Giardia has been detected.

Ashfield ,
Auburn
Bankstown
Botany
Burwood
Canterbury
City of Sydney
Concord
Drummoyne
Hurstville
Kogarah
Leichhardt
Marrickville
Randwick
Rockdale
South Sydney
Strathfield
Sutherland
Waverley
Woollahra

Sydney WATER

media release

FRIDAY 31 JULY 1998 6.00pm

SYDNEY WATER CONFIRMS CONTAMINATED WATER HAS BEEN ISOLATED

Sydney Water confirmed today that the reservoir within the Prospect Water Filtration Plant has been isolated following positive testing of Giardia in one of its clear water tanks.

This means water which normally passes through the reservoir into the system has been closed off from Sydney's water supply.

This occurred at 1.30am Thursday, 30 July, less than five hours after the test results were received.

The Managing Director of Sydney Water, Mr Chris Pollett, stressed that the contamination did not originate within the Plant, but most likely came from the upper canal. This canal was closed the previous evening at 10.50pm following positive testing of Giardia downstream earlier that day.

Mr Pollett said the following remedial action has been taken at the Plant to control the microorganism:

- increased backwashing to clean the filters; and
- increased disinfection.

He said while Sydney Water had considered taking action to close the filters in addition to the reservoir, this had not been deemed necessary because test results taken at 5am this morning had shown zero levels of Giardia.

This means all water coming out of the Prospect Water Filtration Plant is testing zero levels of Giardia. However, monitoring will continue until the Department of Health has given the all clear.

The filtration process, while not originally designed to remove Giardia, reduces its levels by 99.9 per cent.

Further information: Colin Judge 9350 5151

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SYDNEY WATER CORPORATION LIMITED ACN 063 279 849

J Membership of expert panel

• Dr Mark Ferson	Director	South Eastern Sydney Public Health Unit
• Dr Duncan Veal	Senior Lecturer in Biology	Macquarie University
• Prof Tania Sorrell	Director	Centre for Infectious Diseases and Microbiology, University of Sydney Westmead
	Professor	Clinical Infectious Diseases, University of Sydney
• Prof Lyn Gilbert	Director	Centre for Infectious Diseases and Microbiology Laboratory Services, Institute of Clinical Pathology and Medical Research, Westmead
	Clinical Professor	Infectious Diseases Medicine, University of Sydney
• Prof Sydney Bell	Executive Medical Director	South Eastern Sydney Area Laboratory Services