



**Melbourne  
Water**

**Public Health Compliance**

***Quarterly Report***

**Quarter Three 1999/2000**  
(January, February, March)

**Issued by Manager, Science & Technology**

## 1.0 WATER

### 1.1 Major Issues/Incidents/Initiatives.

#### *(i) Partnership for Safe Drinking Water*

The first stage of a pilot program, "Partnership for Safe Drinking Water", has been completed at the Winneke Treatment plant. The partnership is a program designed to optimise the operation of water filtration plants in an effort to reduce the risk of pathogens entering the distribution system. It is being coordinated by the Australian Water Association and the Water Services Association of Australia. The program involved water quality data collection and a self-assessment of the treatment plant, which examined aspects of design, operation and administration aimed at improving treated water quality. This self-assessment showed that Winneke produces high quality water but that minor changes to the standard operating procedures at the plant could further improve water quality. A program to implement these changes has been commenced with most activities scheduled for completion this calendar year.

#### *(ii) Framework for Drinking Water quality Management*

As part of the rolling revision of the Australian Drinking Water Guidelines 1996, MWC, South East Water and the Department of Human Services have completed a desktop trial and assessment of a proposed "Framework for Drinking Water Quality Management". It is anticipated that the Framework will be incorporated into the proposed Victorian Drinking Water Quality Regulations as it provides a process for managing drinking water quality risks. The Framework applies many of the principles of quality and risk management standards to provide specific guidance to water companies. It covers the assessment of hazards, preventative strategies, operational controls, water quality monitoring and emergency response. The work of the Melbourne project team was presented to the NHMRC/ARMCANZ Drinking Water Coordinating Group in Adelaide in March along with other project reports from the Northern Territory, Sydney and Western Australia.

#### *(iii) Water Quality Research and Investigation*

The first stage of a project investigating the effect of chlorine residuals on biofilms in pipelines within the water supply system has begun. The work is being undertaken by the Cooperative Research Centre for Water Quality and Treatment and involves the installation of biofilm sampling devices on major transfer pipelines in the Melbourne system. The information will assist in understanding the impact of biofilms on water quality and on chlorine demands within the transfer system.

A study into the practice of lime dosing at the Silvan Water Treatment Plant has been completed. The study was designed to determine the impact lime dosing has on drinking water turbidity and the potential impacts on downstream water quality. The study indicated that the current lime addition practice adds up to 1.5NTU of turbidity to the water leaving Silvan. Changing to a different type of lime can reduce turbidity by 0.7NTU and lead to improved disinfection efficiency and microbiological quality. A trial to better define performance is to commence in June 2000.

**(iv) Chlorine Leaks**

A chlorine leak occurred at the Frankston chlorinator when a drum change over unit failed and discharged chlorine gas. Safety mechanisms immediately closed the drum down and minimal gas escaped. The closure of the drum resulted in failure to disinfect for 30 minutes. The changeover unit has been overhauled and the frequency of maintenance for the unit increased.

A minor chlorine leak from a faulty pressure relief valve on a storage tank occurred at Winneke Water Treatment Plant during purging of pipework. The storage tank was being drained for a regular 2-yearly inspection and service. During the service the relief valve will be removed and refurbished and valves on other chlorine storage tanks will be checked.

**(v) Disinfection Plant Performance**

A number of minor plant failures occurred during the quarter.

In January, dosage interruptions occurred at Pakenham, Range Road, (on the Mornington Peninsula), Yarra Glen and Yarra Junction chlorinators. The planned installation of a generator at Pakenham in 2000/01 will prevent a recurrence of failures due to power interruptions at this plant. Range Road has suffered dosage control problems that are being rectified as part of the plant's upgrade. The work should be completed by June 2000. Failures at Yarra Glen resulted from metering pump and hypochlorite piping problems that have now been rectified. Yarra Junction failed due to low overnight flows and modifications are under design to eliminate these problems.

In February minor disinfection plant failures occurred at Cardinia, Dromana, Bunyip, Yarra Junction and Frankston chlorinators. In March disinfection plant failures occurred at the Silvan-Preston and Yarra Glen chlorinators.

In all cases incidents were declared and customers notified. The flow of water was managed to ensure that the impact of undisinfecting water on customers was minimised. Incident debriefs have been completed and corrective actions are being undertaken.

**(vi) Tyabb Reservoir**

The installation of the lining and floating cover at Tyabb Reservoir has been completed. An inlet chlorinator required to dose the reservoir with chlorine to prevent microbiological regrowth under the cover has also been installed. The works were necessary to reduce the risk of contamination, improve colour and turbidity and eliminate algal problems associated with the previous open service reservoir at this site.

(vii) ***Morang Pumping Station***

Water stored in Yan Yean Reservoir has been prone to taste and odour problems in recent years due to the presence of certain undesirable algae. On occasions it has been necessary to take the reservoir off-line to address the problem. An alternative supply is provided to consumers in these situations. To ensure this supply can be maintained during times of peak demand a new pumping station has been built to enable water from Morang Reservoir to be pumped into the zone normally supplied from Yan Yean Reservoir.

## **1.2 Regulations and Compliance Targets**

This section summarises the statutory requirements and corporate targets related to the quality of water supplied by MWC. Details of compliance and indicators of microbiological performance are shown in sections 1.3 to 1.5.

The *Health (Fluoridation) Act (1973)* requires the provision of fluoride in drinking water at concentrations not in excess of 1 mg/L. The requirements of the Act are further amplified by the accompanying Standards for Fluoridation of Public Water Supplies. In the Standards the Department of Human Services (DHS) has adopted the recommendations contained in the NHMRC/AWRC 1987 Guidelines for Drinking Water Quality in Australia (referred to as NHMRC/AWRC 1987 Guidelines).

The Health (Quality of Drinking Water) Regulations 1991 made under the *Health Act (1958)* require management of water quality to a standard sufficient to satisfy the DHS that water is not or is not likely to be contaminated. In addition to this requirement, the retail companies monitor within their distribution systems for microbiological characteristics (faecal coliforms and total coliforms) in accordance with NHMRC/AWRC 1987 Guidelines.

The corporate compliance targets which MWC sets are operational targets compatible with statutory requirements. The targets also allow MWC to meet its obligations under the Bulk Water Supply Agreements, which in turn enable the retail companies to deliver water in accordance with the conditions of their operating licences. These conditions include compliance with health related microbiological parameters of the NHMRC/AWRC 1987 Guidelines which incorporate faecal and total coliform counts as indicators.

### 1.3 Statutory Compliance

#### (i) *Fluoridation Plant Reliability*

##### **Compliance with Health (Fluoridation) Act (1973)**

*Long Term Average Dosage not to exceed upper limit of 1 mg/L\**

Treatment Plants	Compliance			
	Q4 98/99	Q1 99/00	Q2 99/00	Q3 99/00
Cardinia				
Research				
Monbulk				
Silvan-Olinda				
Silvan-Preston				
Silvan-Waverley				
Yan Yean	**	**	**	**

\* Long term average concentration over 12 months; quarterly compliance performance reporting is based on the limit of 1 mg/L.

\*\* Reservoir and Plant off line from 22/3/99 to 17/10/99 and 28/12/1999 to 31/3/2000.

Compliance achieved	
Compliance not achieved	
Not applicable	

During Quarter 3 of 1999/2000, the average fluoride concentration at all plants in operation did not exceed 1 mg/L. Over the previous three quarters all plants complied with the *Health (Fluoridation) Act (1973)*. The Act requires the calculated long-term (12 month) average fluoride concentration not to be in excess of 1 mg/L.

##### **Quarterly Compliance with Health (Fluoridation) Act (1973)**

*Short Term Average Dosage to be between 0.7 - 1.2 mg/L\**

Treatment Plants	Compliance			
	Q4 98/99	Q1 99/00	Q2 99/00	Q3 99/00
Cardinia				
Research				
Monbulk				
Silvan-Olinda				
Silvan-Preston				
Silvan-Waverley				
Yan Yean	**	**	**	**

\* Short term - quarterly.

\*\* Reservoir and Plant off line from 22/3/99 to 17/10/99 and 28/12/1999 to 31/3/2000

Compliance achieved	
Compliance not achieved	
Not applicable	

The short-term requirements based on the NHMRC/AWRC 1987 Guidelines are that fluoride concentration levels within the water distribution system should be within the range 0.7-1.2 mg/L. During Quarter 3 all sites in operation were compliant on a quarterly basis.

## **1.4 Compliance Summary**

Summary of Compliance for Corporate Public Health Targets and Performance Standards for Water Quality in the Bulk Water Supply Agreements (BWSAs)

### *Quarter Three 1999/2000*

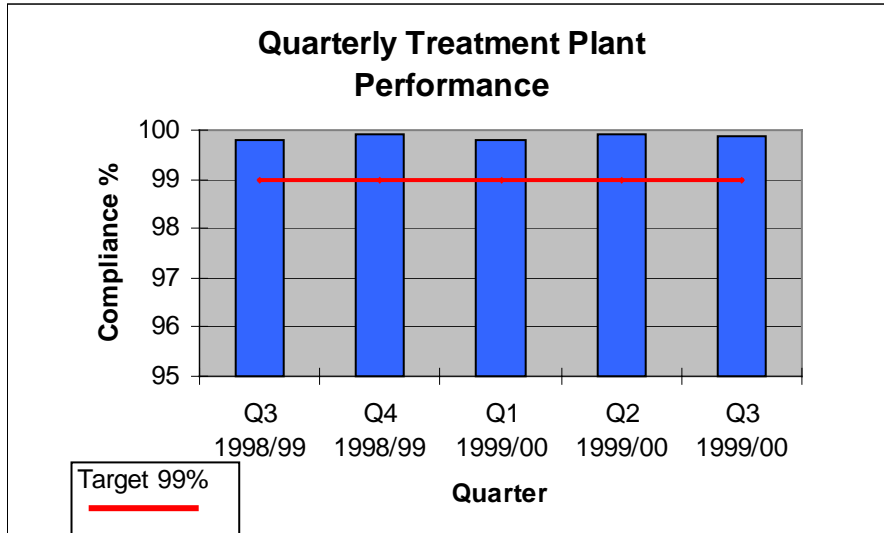
<b>Treatment Plant System</b>	<b>Target Met</b>
Disinfection Performance	Yes
Disinfection Plant Reliability	Yes
Supply to retail companies at entry and water quality monitoring points. (Faecal Coliforms: 99% of samples less than 1 org/100mL)	Yes
Supply to retail companies at entry points (Total Coliforms: 95% of samples less than 1 org/100mL)	Yes
Supply to retail companies at water quality monitoring points (Total Coliforms; 90% of samples no more than 10 org/100mL)	Yes
Trihalomethanes	Yes

During Quarter Three, 1999/2000, MWC complied with the overall performance indicators for water supply.

Detailed information on quarterly compliance against the indicators is given in section 1.5.

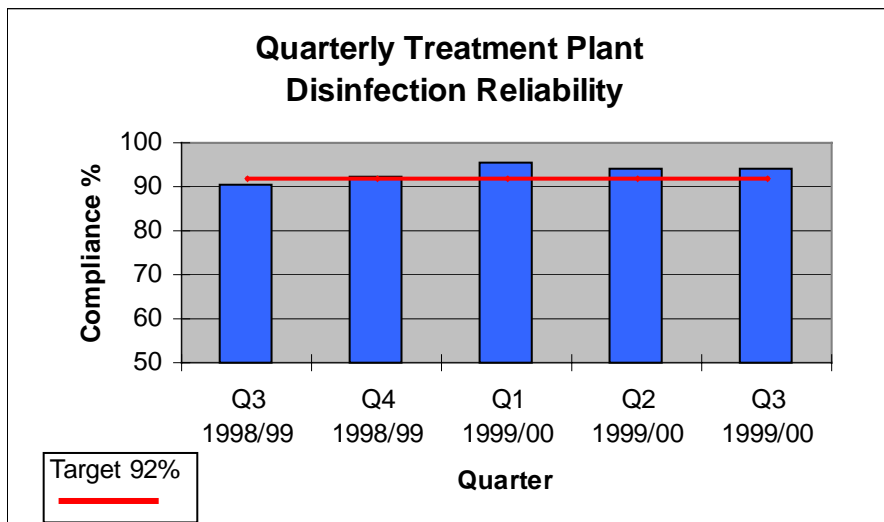
## 1.5 BWSA and Corporate Compliance Details

### (i) *Plant Disinfection Performance*



Disinfection performance shows the percentage by volume of water supplied from disinfection plants which has been effectively disinfected. MWC currently has a corporate target of 99%. The target was met during Quarter Three of 1999/2000.

### (ii) *Plant Disinfection Reliability*



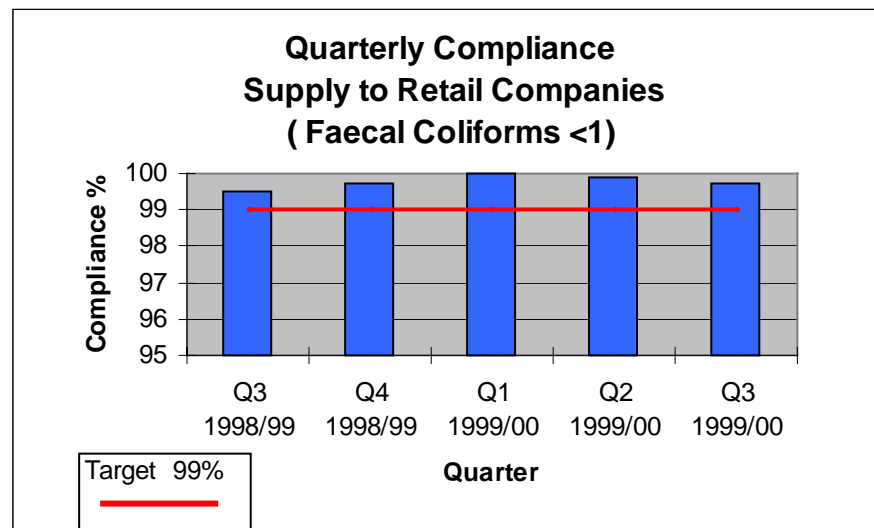
\*Excludes plants in upgrade program

MWC's corporate target for disinfection plant reliability is 92%. The disinfection plants met the quarterly corporate target for 92% of treatment plants to operate satisfactorily for at least 99.5% of their available operating time during Quarter Three of 1999/2000\*.

**(iii) Supply to Retail Companies - Faecal Coliforms**

The overall objective is for no faecal coliforms to be present in the water supply system or detected in any sample. All detections are investigated and appropriate actions are taken. The chart below shows the percentage of samples taken at entry points and water quality monitoring points, which contain less than one faecal coliform bacterium per 100mL. Entry points to supply are monitoring points immediately downstream of primary disinfection. Water quality monitoring points are other points at storages or water mains within the wholesale distribution system. Both are identified in the BWSAs with the retail water companies.

MWC's corporate target for reporting purposes is for 99% of the samples taken not to contain faecal coliform bacteria. This target is more stringent than the requirements of the BWSA's. During Quarter Three of 1999/2000 this target was met.



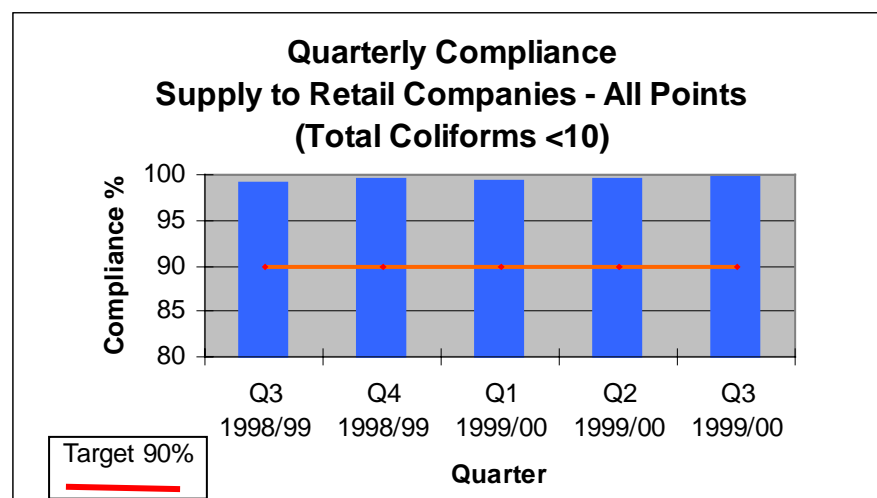
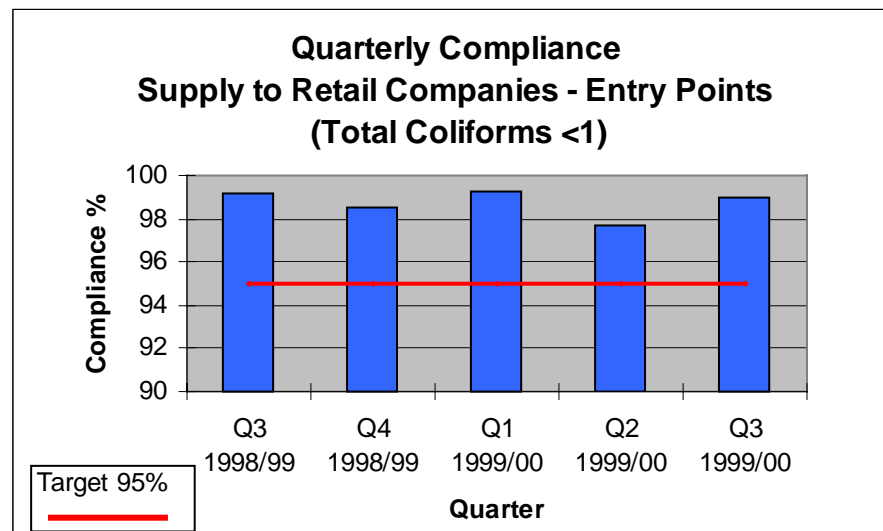
(iv) *Supply to Retail Companies – Total Coliforms*

The target values are:

- At Entry Points to the retail supply system, 95% of scheduled samples should contain no coliform organisms per 100 millilitres.
- At Water Quality Monitoring Points 90% of scheduled samples should contain no more than 10 coliform organisms per 100 millilitres.

Entry points to supply are monitoring points immediately downstream of primary disinfection. Water quality monitoring points are other points at storages or water mains within the wholesale distribution system. Both are identified in the BWSAs with the retail water companies.

In the charts below, the compliance percentages shown are the averages of the values for entry points and all water quality monitoring points obtained for supplies to the three retail companies. For Quarter Three of 1999/2000 the compliance targets were met.



**(v) Notifiable Pathogens**

MWC carries out routine monitoring of pathogens at representative sites at supply and service reservoirs. All source waters are monitored each quarter. Certain pathogens are classed as notifiable because in active form they are capable of causing illness. Upon detection the testing laboratory is required to immediately notify the DHS. Target values have not been set for these organisms. MWC responds on detection of any non-zero levels. During the quarter 33 samples were examined for the full range of pathogens. There were no notifiable pathogens detected in the routine monitoring program.

Results of Routine Pathogen Monitoring				
Pathogen name	All Supplies			
	Q4 1998/99	Q1 1999/2000	Q2 1999/2000	Q3 1999/2000
Giardia				
Cryptosporidium				
Salmonella				
Campylobacter				
Vibrio				

Pathogen detected	
Pathogen not detected	

**(vi) Trihalomethanes (THMs)**

Trihalomethanes are present in drinking water principally as by-products of disinfection using chlorination. Some epidemiological studies have reported associations between the ingestion of chlorinated drinking water and increased cancer mortality rates. However the International Agency for Research on Cancer has concluded that the available data for chlorinated water provide inadequate evidence of carcinogenicity in humans.

The BWSAs require that 95% of all samples taken at a monitoring point must contain no more than 150 micrograms per litre. Action is required to be taken if the THM concentration at a monitoring point exceeds 150 microgram per litre for three successive samples. Sampling at selected sites is carried out to provide adequate data on the quality of water supplied to the retail water companies. It is performed on a quarterly basis.

The Australian Drinking Water Guidelines 1996 state that the concentration of THMs should not exceed 250 micrograms per litre. Targets in some overseas guidelines and standards are below this level and further reductions have been proposed.

Water quality zones	Performance (micrograms/litre)			
	Quarter 1 1999/2000	Quarter 2 1999/2000	Quarter 3 1999/2000	Quarter 4 1999/2000
St Albans	9	22	12	
Werribee	32	29	37	
Footscray	31	27	33	
Northcote	29	29	36	
Nth Melb St Kilda				
Dromana Rosebud	5	7	26	
Frankston E	11	15	13	
Mornington	8	13	16	
Mulgrave	21	15	17	
Malvern	43	41	25	
Whittlesea	NT	20	NT	
Yarra Glen	61	65	82	

Target achieved	
Not tested during quarter	NT

Target not achieved	
Action required	

Notes: Some monitoring points serve multiple water quality zones.  
Whittlesea was not tested in quarters one & three as Yan Yean supply had been off line with supply from Silvan.

## 2.0 SEWERAGE

### 2.1 Major Incidents/Initiatives/Issues

#### (i) *Mornington Treatment Plant Chlorination Failure*

Effluent from South East Water's Mornington Treatment Plant discharges to the South Eastern Outfall Sewer (SEO) and then to the ocean at Boags Rocks. On 19 January 2000 chlorination of effluent from the plant failed for some seven hours during which time the volume of undisinfected effluent was estimated as 1.1ML. This was diluted by flow from the Eastern Treatment Plant (ETP). When notified of the incident, MWC arranged for sampling from the outfall and from the beach near the outfall. Higher than normal *E.coli* levels were recorded in the SEO at its outlet and at the beach immediately adjacent to it, but not in the effluent discharged from ETP or at other sampling points. As a result of the incident South East Water (SEW) has provided a report to the EPA, reviewed its incident notification and declaration process and intends to make improvements to the effectiveness of its chlorine disinfection facilities. An adjustment to payments to MWC by SEW for failure to chlorinate the effluent and for extra sampling was made in accordance with the Bulk Sewerage Agreement.

#### (ii) *Blue Green Algae at Western Treatment Plant (WTP)*

Potentially toxic blue green algae (*Microcystis* spp.) has been detected in several lagoon systems at WTP including Lake Borrie North, 115E, 145W 'A' and 55E. The Lake Borrie North outlet has been closed. A program of weekly monitoring of the levels of blue green algae has been implemented. In cases where these have exceeded alert levels notification of the appropriate authorities (Environment Protection Authority, Department of Natural Resources & Environment and Department of Human Resources) has occurred and warning signs erected as required by regulation. At this stage the presence of blue green algae is having only a minor impact on the Plant's treatment capacity and as cooler weather approaches the situation is not expected to worsen. In previous years algae outbreaks have not extended beyond the end of May.

#### (iii) *Offshore Monitoring Program – Eastern Treatment Plant (ETP) Discharge*

In accordance with initiatives identified through the ETP Effluent Management Study, MWC has committed to a microbiological monitoring program in the coastal area impacted by the discharge offshore from Boags Rocks. Australian Water Technologies has been engaged to undertake the work that is programmed from March 2000 to February 2001. Four indicator bacteria are being measured. They are thermotolerant coliforms, *E.coli*, enterococci and faecal streptococci. The data will provide a baseline for comparison with the draft World Health Organisation (WHO) Recreational Water Quality Guidelines. These guidelines propose the use of faecal streptococci to assess the level of beach contamination and hence health risk. The monitoring program will ensure MWC is well prepared for any future change in EPA licence conditions based on the WHO guideline.

## **2.2 Statutory Compliance and Reporting**

### ***(i) Bacteriological Conditions of Receiving Waters Required under the Environment Protection Authority Licence - Eastern Treatment Plant.***


MWC is required to monitor the effect of the treated wastewater discharged from the Eastern Treatment Plant (ETP) on the bacteriological quality of the receiving water near the point of discharge at Boags Rocks. Monitoring is required of the actual discharge and at six designated locations along the foreshore, including Gunnamatta Beach, at least once every seven days. Samples are measured for *E.coli*.


#### **(a) Statutory Compliance and Reporting - Discharge Point**

The Environment Protection Authority (EPA) licence specifies annual median and 90<sup>th</sup> percentile performance limits of 200 org/100mL and 1000 org/100mL respectively, for the discharge point. During the third quarter, one result was in excess of the median and 90<sup>th</sup> percentile limits. However for the first three quarters the median and 90<sup>th</sup> percentile are on target to meet the annual limits.

#### ***Compliance with specified levels of E.coli***

<b>Parameter</b>	<b>Compliance target</b>
<i>E.coli</i> - annual median.	
<i>E.coli</i> - annual 90th percentile	

Compliance on target 



Compliance not on target 


#### **(b) Statutory Reporting - Foreshore Locations**

The EPA licence requires monitoring at the sites but reporting of results only when specified targets are exceeded. These are for a geometric mean of 200 org/100mL and an 80<sup>th</sup> percentile of 400 org/100mL over each 42 day period beginning 1 July of each year. For the third quarter of 1999/2000 both mean and 80<sup>th</sup> percentile results were below targets and reporting was not required.

#### ***Reporting of Results in Accordance with Licence Requirements***

<b>Parameter</b>	<b>1999/2000</b>			
	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>
<i>E.coli</i> -geometric mean				
<i>E.coli</i> - 80th percentile				

Reporting not required   
 Report required and submitted 

Report required but not submitted 

(ii) ***Bacteriological Conditions of Receiving Waters Required under the Environment Protection Authority Licence - Western Treatment Plant.***

The Waste Discharge Licence for Western Treatment Plant (WTP) requires MWC to monitor the effect of the discharge on the bacteriological conditions of the receiving waters of Port Phillip. Monitoring is required of the actual discharges from WTP and offshore at two locations, which are accessible from public roads. Samples are measured for *E.coli*.

Statutory Compliance and Reporting

The EPA licence requires weekly monitoring for *E.coli* at the four discharge points. However no guidelines or limits have been established and results are only required as part of the annual report to the EPA in October each year.

At the two foreshore locations the EPA licence requires monitoring at the sites and reporting of results when limits are exceeded. These are a geometric mean of 1000 org/100mL and an 80<sup>th</sup> percentile of 2000 org/100mL over each 42 day period beginning 1 January of each year. For the third quarter of 1999/2000 both mean and 80<sup>th</sup> percentile results were below targets and reporting was not required.

***Reporting of Results in Accordance with Licence Requirements***

Parameter	1999/2000			
	Q1	Q2	Q3	Q4
<i>E.coli</i> -geometric mean				
<i>E.coli</i> - 80th percentile				

Reporting not required		Report required but not submitted	
Report required and submitted			

Appendix Two contains an explanation of the *E.coli* bacteriological contamination indicator.

## 3.0 WATERWAYS & DRAINAGE

### 3.1 Major Incidents/Initiatives/Issues

#### (i) *Syringes on Beaches*

Two instances of needle stick injuries from used syringes occurred on bayside beaches in January 2000. Considerable media coverage resulted on the risks to the community of blood borne virus transmission from inappropriately disposed of syringes. A Task Force of representatives from bayside councils, EPA, DHS and MWC was established to address the issue. Four committees were formed to address aspects relating to beaches, the drainage catchment, health, and community education and behavior. The General Manager of Waterways and Drainage represented MWC on the Task Force, which has made a number of recommendations related to management of the drainage system. The recommendations generally endorse the directions of MWC in encouraging a partnership with local government to improve the environmental management of stormwater and focusing on controlling litter where it is generated rather than relying on expensive end of pipe solutions. EcoRecycle Victoria will also give an initial allocation of \$200,000 to Bayside councils this year for the installation of litter traps in target areas.

#### (ii) *Botulism Outbreak*

An outbreak of botulism along Gardiners Creek in Glen Iris resulted in a significant loss of fauna including about 70 ducks as well as other birds and fish. The deaths occurred over several weeks. Warning signs have been erected and the EPA is investigating the cause of the deaths. Outbreaks of botulism tend to be seasonal in nature. They usually occur in mid to late summer during hot, dry weather, within shallow waterways that have little or no flow and where large amounts of decaying organic matter may exist. Poisoning occurs from the ingestion of a toxin that is produced by *Clostridium botulinum*, a genus of anaerobic spore bearing bacteria that is widely distributed in nature. The outbreak has now run its course with daily inspections revealing no further deaths.

#### (iii) *Algal bloom in Kingswood Retarding Basin*

The Kingswood Retarding Basin was inspected during March 2000 and a dense growth of algae was observed, covering about half of the water surface to a depth of about 20 to 40 cm. The alga was not blue-green, but identified as a green filamentous type (*Hydrodictyon*). This alga is not known to produce toxins or contact irritants and is not considered a public health risk. The *Hydrodictyon* bloom was probably triggered by the extended period of hot and dry weather. Several potential sources of nutrients to the waterway (a golf course, market gardens, flower growers, and adjacent houses) may have contributed to the bloom. Dying birds were also recovered from the retarding basin and sent to the Victorian Institute of Animal Sciences for pathology. The cause of death has not been positively identified, although poisoning from pesticides has been ruled out. The bloom has since cleared and no other dead birds were found.

(iii) ***Blue-green Algal Blooms***

A number of blue green algal blooms persisted or developed in water bodies or creeks during the quarter.

Blooms have persisted at Lakes Carramar and Illawong, two lakes that form part of the Quiet Lakes system, adjacent to Patterson Lakes. Details were reported in the Quarter 2 report. In March a bloom also developed in Lake Legana the third of the Quiet Lakes. Water levels have been manipulated in order to disrupt the blooms and a twelve month study has begun to determine the most appropriate method of preventing blooms in the future.

The blue green algal bloom in the Monbulk Creek Retarding Basin (that was also reported in the Quarter 2 report) endures. Structural works have been undertaken to prevent thermal stratification and it is anticipated that these will ameliorate conditions in future. A trial of a new clay product specifically developed to counter blooms of algae by stripping phosphorus from the water column and sediments is being considered.

A blue green algal bloom was confirmed in the Merricks Creek estuary at Somers during February. The bloom mainly consisted of the potentially toxic alga *Oscillatoria* and another alga called *Arthrospira*. Shifting sands closed the mouth of the estuary and this has triggered the bloom primarily by preventing tidal flushing and circulation. Discussions with the Department of Natural Resources and Environment led to a small channel being constructed through the sandbank that re-engaged tidal flushing with the estuary. However the temporary channel had only limited success as the mouth of the estuary soon closed over again.

In February, a blue-green algal bloom developed in the Berwick Springs Lake (Greaves Road Retarding Basin). It consisted of the potentially toxic blue-green called *Microcystis aeruginosa*. The hot, sunny and dry conditions, along with elevated nutrients, are likely to have encouraged the bloom. Water quality sampling conducted by MWC, the EPA and a consultant to the Berwick Springs developers, indicates that elevated nutrients occur during storm events. MWC has been assisting the EPA with an investigation into nutrient sources.

In all cases standard procedures are followed. These include the erection of warning signs and notifications to local residents, municipalities and relevant government agencies.

Details of MWC's current role in blue green algae management, under the statewide coordination network, are outlined in Appendix Three.

### **3.2 Statutory Compliance**

MWC has no existing statutory requirements for public health performance in the Waterways and Drainage business.

### **3.3 Corporate Compliance**

There are no existing corporate targets.

### **3.4 Meeting “State environment protection policy” (SEPP) Objectives**

As part of MWC’s Waterway Water Quality Monitoring Network, *E.coli* was monitored throughout the quarter at 72 sites. A more extensive monitoring program involving 20 sites sampled weekly over an eighteen-week period during the summer period was also conducted.

The following information provides details on the levels of *E.coli* in Melbourne’s waterways using SEPPs as aspirational targets.

SEPP objectives are established according to the “beneficial uses” associated with the particular waterway. In the case of “primary contact recreation” involving direct contact with the water (e.g. swimming, water skiing), there is a possibility that some of the water may be ingested. The SEPP objective for “primary contact recreation” is therefore < 200 organisms/100 mL. In waterways where “secondary contact recreation” occurs, that is, where direct contact with the water is possible but with a lower risk of ingestion (e.g. boating, fishing), the SEPP objective is less stringent at < 1000 organisms/100 mL.

SEPP objectives at sampling sites differ depending on the use of the waterway. Different objectives have been set for the sampling sites shown in the following charts. An accompanying map indicates the location of sampling sites.

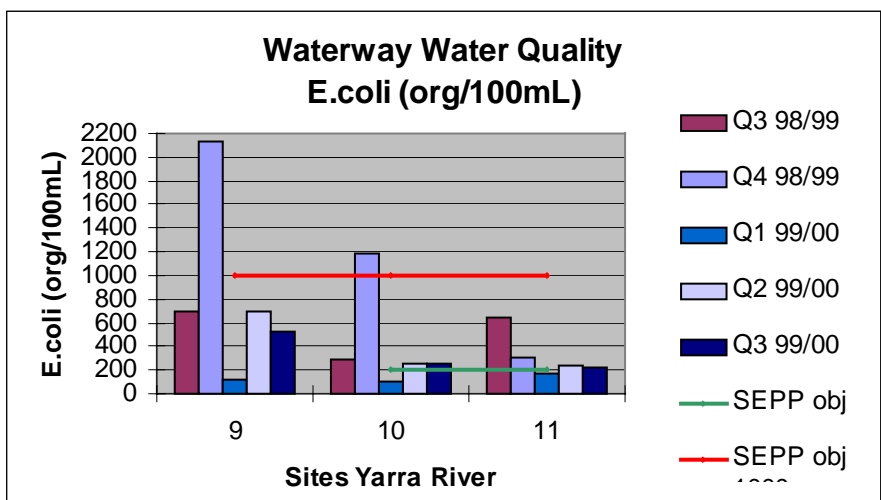
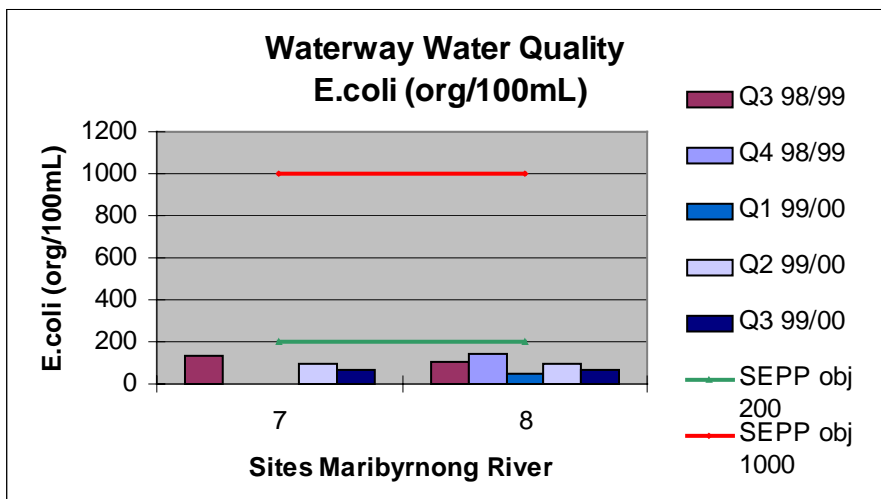
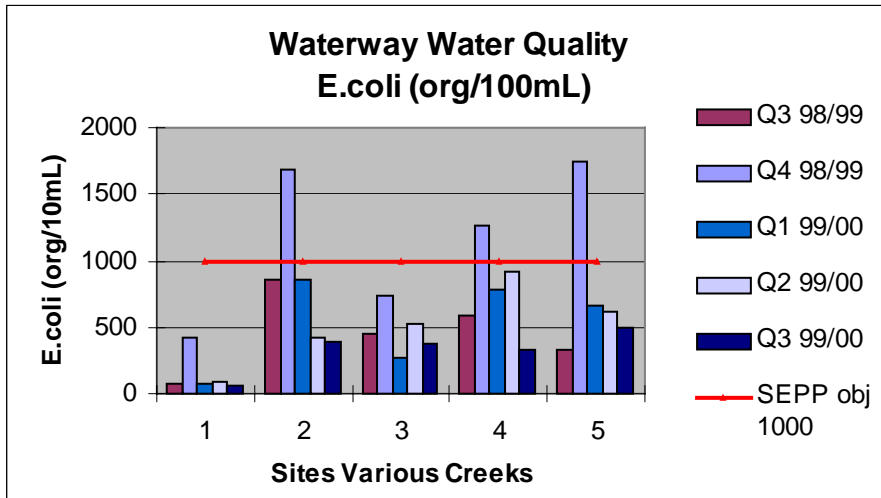
During the quarter, as with the previous quarter, eight of the ten key sites had low *E.coli* levels relative to their SEPP objectives. The two ‘exceeding’ sites, based on 13 samples over three months, were the Yarra River at Chandler Highway (Kew) and the Yarra River at Spadonis Reserve (Coldstream). Exceedances at these sites were slightly above the SEPP geometric mean of 200 organisms/100 mL, with 256 organisms/100 mL at Chandler Highway and 221 organisms/100 mL at Spadonis Reserve.

Although the key sites tended to perform well, several other monitoring sites throughout Greater Melbourne had elevated *E.coli* according to their SEPP objective. In some cases, elevated *E.coli* is believed to be associated with rain during or immediately prior to sampling. In these instances there is an increased likelihood of contamination from stormwater and sewer spills. Other cases of elevated *E.coli*, not associated with rainfall, may include faecal sources such as sewer leaks, septic tank effluent, illegal sewerage connections and stock defecating directly to waterways.

An explanation of the *E.coli* bacteriological contamination indicator is contained in Appendix Two.

Quarterly E.coli geometric means for primary water quality monitoring sites.

(See next page for location of sites)



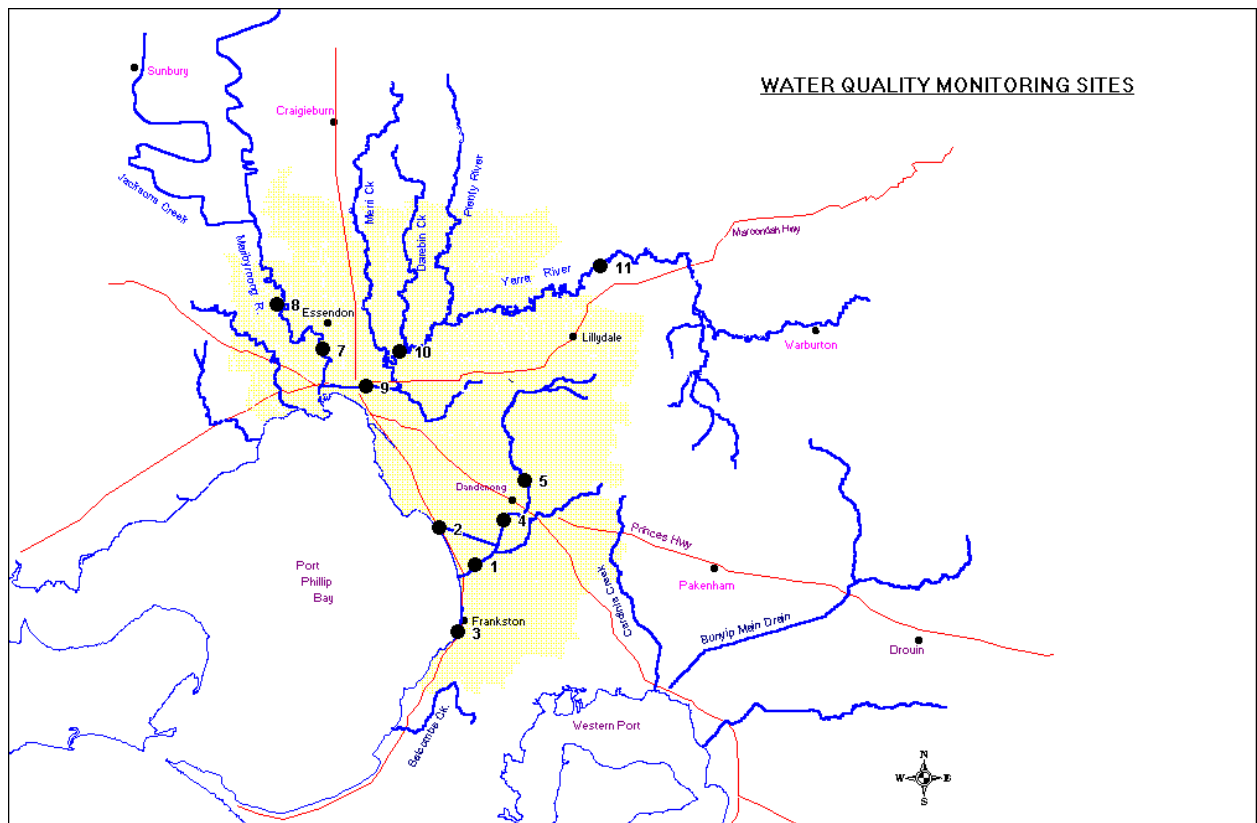
SEPP 'Waters of Victoria' specifies two objectives for Sites 7 & 8, where the objective for *E. coli* is < 1000 (org/100mL), except where swimming occurs. Then the objective is < 200 (org/100mL). The SEPP objective for Site 9 has changed from < 200 org/100mL to < 1000 org/100mL under the new Waters of the Yarra Catchment SEPP.

## Water Quality Monitoring Locations

Site Number	Site Reference	Location
Site 1	AM008	National Water Sports Centre Outlet
Site 2	AM009	Mordialloc Creek at Wells Road
Site 3	AM010	Kananook Creek at Wells Street
Site 4	AM049/051	Dandenong Creek at Olive Grove/Pillars Crossing
Site 5	AM050	Dandenong Creek at Stud Road
Site 6	No longer sampled	Mordialloc Creek at Railway Bridge
Site 7	MT04	Maribyrnong River downstream Ascot Vale MD
Site 8	EPA3030	Maribyrnong River at Brimbank Park
Site 9	LY08	Yarra River at Princess Bridge
Site 10	EPA4940	Yarra River at Chandler Highway
Site 11	MY22	Yarra River at Spadonis Reserve

Notes: Site 6 is no longer sampled as a result of modifications to the sampling program made at the request of the EPA.

Site 7 is only monitored for *E.coli* during the summer sampling program



## 4.0 CORPORATE

### **4.1 Major Incidents/Initiatives/Issues.**

#### ***Productivity Commission Study on Arrangements for Setting Drinking Water Quality Standards***

In early 1999 the Productivity Commission initiated an international benchmarking study to compare the regulatory arrangements for setting drinking water quality standards in Australia and overseas. All Australian jurisdictions were included and compared with Canada, the European Union, France, New Zealand, the United Kingdom and the United States of America. The study covered arrangements for setting, monitoring and enforcing standards for drinking water with emphasis on microbiological aspects because these have the greatest potential to drive water industry costs. The Commission issued a draft report in December 1999. The key findings were:

- There are significant differences in approach within Australia and between Australia and overseas
- The Australian approach is generally less prescriptive than in Europe, the United Kingdom and the United States and there is less emphasis on economic evaluation of options
- The scope and stringency of standards is increasing (with consequential increases in treatment costs) despite the uncertainty about any resulting health benefits
- Procedures to resolve scientific uncertainty are imperfect and evaluation of public health benefits is either confounded by these uncertainties or not attempted at all
- The arrangements for transparency, accountability and legal responsibility differ between Australia and overseas.

MWC provided written comments on the draft, the key points being:

- The heavy handed approach to regulation in the United States and the United Kingdom has imposed significant costs that may be out of proportion to the anticipated improvements in health outcomes
- There is evidence that the USEPA approach has shortcomings and is being modified to include a more open process involving participation and consultation with key stakeholders
- The report would be improved if the Commission provided some guidance on the principles that might underpin a preferred model for institutional arrangements and standard setting.

The Commission's final report was released on 14 April 2000. Coverage has occurred in the print media.

### **4.2 Statutory Compliance**

#### ***Incidence of *Cysticercus bovis* (*C.bovis*) at Werribee Agriculture***

During the quarter all cattle sales conducted by Werribee Agriculture complied with S.44 (1) of the Livestock Disease Control Act as it relates to *C.bovis*.

### **4.3 Corporate Compliance**

Not applicable

### **4.4 Beach Report Program**

The Beach Report Program (previously Beachwatch), undertaken by the Environment Protection Authority, is designed to monitor bacteriological contamination in Port Phillip Bay. It has the following specific purposes:

- to assess compliance of water quality against State Environment Protection Policies for the Waters of Port Phillip
- to determine trends in the bacterial water quality of Bay beaches
- to provide the community with information on the bacteriological condition of Bay beaches (reported on the EPA web site and in the daily press)

In the event of *E.coli* exceeding acceptable levels at a particular beach, the EPA advises the public to avoid swimming at that beach.

In some cases MWC's operations (such as sewage spills) can have an impact on *E.coli* levels recorded at Bay beaches which can result in recommendations against swimming. The quality of stormwater run-off also has a significant impact on the quality of water at Bay beaches.

The 1999/2000 Beach Report Program commenced on 1/12/1999 and concluded on 31/3/2000. Thirty-six bayside beaches were monitored at three-day intervals from Christmas to the end of January and weekly at other times.

There was only one occasion during the quarter when the EPA issued a media release to advise against swimming and that was for Port Melbourne beach following rain on 23 January 2000. High *E.coli* levels were recorded on two consecutive days at the sampling site but then reduced to very low levels for the remainder of the season. The exact source of the contamination was not established.

Appendix Two contains an explanation of the *E.coli* bacteriological contamination indicator.

## 5.0 APPENDICES

### Appendix One: Guide to Terms

Term/Parameter	Units	Definition
<b>Total Coliforms (TC)</b>	number of organisms per 100mL	The total number of coliform organisms present in a 100mL water sample. Used as a primary indicator organism due to relative ease of detection.
<b>Faecal Coliforms (FC)</b>	number of organisms per 100mL	Thermotolerant coliform organisms mainly indicating faecal pollution of the water supply. These are measured as a percentage of samples with faecal coliforms less than 1 per 100 mL of water.
<b>Escherichia coli <i>E.coli</i></b>	number of organisms per 100mL	A common bacteria from the intestines of warm blooded animals including humans. Used as an indicator of faecal contamination.

### Appendix Two: Escherichia Coli (*E.coli*) as a bacterial indicator

*E.coli* is used throughout the world as an indicator of faecal contamination as it is associated with the presence of pathogenic bacteria and viruses in the water. MWC and the EPA monitor waterways and beaches for the presence of *E.coli* through the Water Quality Monitoring Network and Beach Report programs as scientific studies have demonstrated an association between *E.coli* levels and the degree of health risk to swimmers.

While an increase in *E.coli* levels can indicate the presence of disease-causing bacteria, the overall risk of illness from swimming in Port Phillip Bay is relatively low. Illnesses such as ear, throat and gastric conditions may occur where swimmers have been exposed to higher than acceptable *E.coli* levels.

State environment protection policies are designed to reflect acceptable levels of *E.coli*. Although the *E.coli* limit for swimming is set at <200 org/100mL, an *E.coli* level of 0-400 org/100mL is considered acceptable. A result of 400-1000 org/100mL is considered elevated and levels over 1000 org/100mL are considered unacceptable conditions for swimming. In the event of unacceptable *E.coli* results, the EPA makes a recommendation to local Councils and the general public to avoid swimming in the contaminated area.

Bacteriological contamination in Port Phillip Bay is usually confined to beaches near stormwater or stream outlets. Sources of contamination which enter the Bay through urban streams and stormwater drains, are derived from domestic animals, septic tank overflows and sewage spills.

### Appendix Three: Melbourne Water's role in blue-green algae management

MWC's Product Businesses conduct algal bloom monitoring of water bodies under their control and have algal bloom response plans in place.

The Water Business is concerned with reservoirs while the Sewerage Business is principally concerned with wastewater treatment lagoons.

Waterways and Drainage monitors many of the water bodies under its control. These are selected for monitoring on the basis of history of incidence, susceptibility to blooms and potential consequences. Historically some water bodies not under Melbourne Water's control were included in monitoring programs. However this situation no longer occurs and local water managers, generally municipalities, are now aware of their responsibilities in this regard. If a bloom of a potentially toxic blue-green algae is discovered in a water body, a number of management actions are considered and implemented by the responsible management group. Toxicity testing can be undertaken, along with aeration of the water body, posting of signs, media releases and increased monitoring.

The Department of Natural Resources and Environment is the statewide coordinator for addressing blue-green algal blooms within Victoria. A network of eighteen "convening agencies" has been established to provide a sub-coordinating role and a means of managing outbreaks of blue green algae, which occur on a regional scale, ie. when more than one local water manager is involved.

The convening agencies for the State are drawn from rural water authorities, non-metropolitan urban water authorities, MWC and NRE regions. MWC, through the Waterways and Drainage Group, is the convening agency for the metropolitan area (Bunyip, Yarra and part of the Maribyrnong catchments).

The role of the convening agency is to compile a regional coordination plan and arrange for the establishment of a response group to manage the bloom. In the event of a bloom, the NRE, DHS and the relevant convening agency are informed in writing by the authority responsible for the waterway or water body in question.