



**Melbourne
Water**

Public Health Compliance

Quarterly Report

Quarter Two 2007/08
(October, November, December 2007)

DRINKING WATER

Issues/Initiatives/Incidents

Upper Yarra Reservoir Water Quality Incident

After many months of record drought conditions the storm event of Wednesday 27 June 2007 produced very turbid inflows to Upper Yarra Reservoir. On Monday 16 July, following consultation with the Department of Human Services, Yarra Valley Water issued a boil water notice to customers in East Warburton. The rest of the Yarra Valley townships between Warburton and Woori Yallock were issued boil water notices later that same week. This was a precautionary notice to approximately 6000 customers and was based on the turbidity being high enough (ie. > 20 NTU) to create some uncertainty about the effectiveness of the disinfection.

The boil water notice was lifted on 14 August 2007 when turbidity of Upper Yarra water was deemed to be satisfactory (less than 10 NTU). Melbourne Water has approved the installation of five small, package media-filtration plants to treat the turbid water to a standard that will enable effective disinfection of the water.

The turbidity in Upper Yarra reservoir has continued to improve and is nearing pre-incident levels. The temporary filtration units will provide security of supply in the event of significant rainfall resulting in high turbidity. Additional measures to reduce the impact of turbid water from Upper Yarra on Silvan Reservoir, including the plan for turbidity curtains to be installed at the Yarra Silvan Conduit inlet, have been put in place.

During the course of the design and construction of the temporary filtration plants, several additional issues arose which have caused some overall delays from the original program, including the need for chemical dosing prior to the filters, associated bundling and OH&S requirements and the need for booster pumps to maintain pressure in the reticulation zones, as the headlosses through the filters are greater than expected

Commissioning of the temporary filtration units at Lusatia Park, Lyrebird Avenue and Brahams Road is expected to be undertaken in January and early February 2008.

The temporary filtration unit at Yarra Junction has been significantly delayed due to saturated ground conditions and the need to relocate a fibre optic cable at the site. The unit at Martyr Road has also been delayed due to the need to install platforms on piers to mount the equipment due to site space constraints. Both these sites should be commissioned in February 2008.

Disinfection Failures – Monbulk and Lusatia Park Primary Chlorinators.

There were two failures of primary disinfection plants during Quarter Two. Each of these failures affects the Corporate Disinfection Reliability Target.

The first failure was on 28 November 2008 at the Monbulk Primary Disinfection Plant. The plant experienced a burst injection line on booster pump No1, which

caused the disinfection failure. The plant was off-line for 54 minutes but no un-disinfected water was supplied to customers.

The second failure occurred on 17 December 2008 at the Lusatia Park Treatment Plant. The plant experienced a zero-disinfection event as a result of the storage of sodium hypochlorite emptying before being refilled. A 20 litre container of sodium hypochlorite was connected to the plant and disinfection returned to normal. Procedures have been put in place to ensure timely delivery of sodium hypochlorite. During the incident, the plant was supplying un-disinfected water to consumers for 1 hour and 33 minutes.

This excursion did not require formal notification to the Department of Human Services (DHS) or corrective action involving a boil water notice due to recent changes to the protocol for disinfection failures. During 2007, Melbourne Water and the retail water companies engaged a consultant to undertake a quantitative microbial risk assessment (QMRA) of the drinking water system, with a view to develop a protocol for DHS notification due to disinfection failures. The quality of source water, time to consumer, recent weather conditions were all taken into account when determining the acceptable outage time for different waters and treatment plants. In the case of Lusatia Park, the duration of zero-disinfection was within the bounds considered acceptable in the DHS protocol. This protocol results in DHS being notified of failures only if there is a public health risk to consumers.

Greenvale-St Albans Main (M193) Taste and Odour Incident

In November and December 2007, City West Water received a significant number of taste and odour complaints from customers receiving water from the Greenvale-St Albans Main (M193). This is one of Melbourne Water's coal tar enamel-lined mains and has been associated with previous taste and odour incidents.

The first taste and odour incident occurred on 29 November 2007, with 37 customer complaints recorded by City West Water. Customers complained of a chemical taste in the water. It is believed that this occurred when flow in the Greenvale-St Albans Main was reduced due to operational changes in the system as a result of works being undertaken on a new main at the St Albans Reservoir outlet. The longer detention times and reverse flows in M193 resulted in taste and odours being generated. The flow in M193 was increased and the number of complaints dropped immediately.

The second taste and odour incident occurred on 19 December 2007, with 41 customer complaints recorded by City West Water. In this instance the Greenvale inlet main had been recharged after a planned shut down and the water flushed into St Albans tank. A valve (CC) was opened and a volume of "stale" water entered the reticulation system – this led to the taste and odour complaints. The CC temporary chlorinator was not operational at that time and low chlorine residuals were believed to add to the problem. The incident is to be debriefed and the CC plant is to be made fully operational. Procedures are to be implemented to ensure the chlorination plant is operational when valve CC is open.

Investigations are being planned to determine the circumstances under which taste and odours are generated in water in M193. Representatives from Research and

Technology and Operations will meet in February 2008 to determine if a research project is required to better identify the types of tastes and odours and factors that influence their generation and possible solutions.

Catchment and Water Supply Asset Security

During the quarter 39 minor security breaches were recorded. These predominately involved the cutting of fences, trespassing, vandalism, fishing and littering in the catchments. These security breaches had no discernible impact on water quality.

Regulations and Compliance Targets

This section summarises the statutory requirements and corporate targets related to the quality of water supplied by Melbourne Water. Details of compliance and indicators of microbial performance are shown in the following sections.

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) 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 2002*, made under the *Health Act 1958*, have been repealed by Part 6 of the *Safe Drinking Water Act 2003* and have been replaced by the *Safe Drinking Water Regulations 2005*. The drinking water quality standards set under the Regulations apply at prescribed sampling points and are the responsibility of the water supplier (the retail water businesses in Melbourne).

Melbourne Water and the retail water companies have amended the water quality standards (Schedule 3) in the Bulk Water Supply Agreements (BWSAs). This ensures consistency with the standards in the Regulations that the retail water businesses must meet at customer taps. The new regulations came into force on 19 July 2005.

Melbourne Water has requirements to meet service standards for the Essential Services Commission, which came into force at the beginning of 2005. These standards are based on the standards in the BWSAs.

Melbourne Water also sets some operational targets compatible with statutory requirements. The targets aim to allow Melbourne Water to meet its obligations under the BWSAs and enable the retail water businesses to deliver water in accordance with the conditions of their operating licences. These conditions include compliance with health related parameters of the Australian Drinking Water Guidelines 2004.

Statutory Compliance




Fluoridation Plant Reliability

Compliance with Health (Fluoridation) Act (1973)

Based on Long Term (12 mth) Average Dosage not to exceed 1 mg/L

| Treatment Plant | Compliance | | | |
|------------------|-------------|-------------|-------------|-------------|
| | Q3 06/07 | Q4 06/07 | Q1 07/08 | Q2 07/08 |
| Cardinia | | | | |
| Research/Winneke | | | | |
| Monbulk | | | | |
| Silvan-Olinda | | | | |
| Silvan-Preston | | | | |
| Silvan-Waverley | | | | |
| Yan Yean | # | # | # | # |

Yan Yean Reservoir and Plant off line from 5/02/2007 to 31/12/2007.

| | | | | | |
|---------------------|---|----------------|---|-------------------------|---|
| Compliance achieved |  | Not applicable |  | Compliance not achieved |  |
|---------------------|---|----------------|---|-------------------------|---|




During Quarter Two the average fluoride concentration at all plants did not exceed 1 mg/L.

Quarterly Compliance with Health (Fluoridation) Act (1973)

Quarterly Average Dosage to be between 0.7 - 1.2 mg/L

| Treatment Plants | Compliance | | | |
|------------------|-------------|-------------|-------------|-------------|
| | Q3 06/07 | Q4 06/07 | Q1 07/08 | Q2 07/08 |
| Cardinia | | | | |
| Research/Winneke | | | | |
| Monbulk | | | | |
| Silvan-Olinda | | | | |
| Silvan-Preston | | | | |
| Silvan-Waverley | | | | |
| Yan Yean | # | # | # | # |

Yan Yean Reservoir and Plant off line from 5/02/2007 to 31/13/2007.

| | | | | | |
|---------------------|---|----------------|---|-------------------------|---|
| Compliance achieved |  | Not applicable |  | Compliance not achieved |  |
|---------------------|---|----------------|---|-------------------------|---|

During Quarter Two all sites were compliant on a quarterly basis.

Compliance Summary

Summary of Compliance for Corporate Public Health Targets and Performance Standards for Water Quality in the Bulk Water Supply Agreements (BWSA) and the Essential Services Commission (ESC) Standards

Quarter Two 2007/08

| Compliance Measure | Target Met |
|--|-------------------|
| Primary Disinfection Plant Reliability (Corporate target 100%) | No |
| Secondary Disinfection Plant Reliability (Corporate target 100%) | Yes |
| Supply to retail companies at entry and water quality monitoring points - <i>E.coli</i> . (Corporate target - 100 % of samples < 1 org/100 mL) | Yes |
| Trihalomethanes and Haloacetic Acids (BWSA - 100% of samples meet standards) | Yes |
| Aluminium - aesthetic parameter (Compliance with ESC Standards) | No |
| Turbidity - aesthetic parameter. (Compliance with ESC Standards) | No |

As of July 2007, the Corporate Targets for Disinfection Plant Reliability were amended. Previously the Corporate Target of 96% was a combined reliability measure. From Quarter One 07/08, the reliability of primary and secondary chlorinators will be reported separately with a Corporate Target of 100% each. Additional information describing the individual reliability targets is contained in the next section.

New regulations under the *Safe Drinking Water Act 2003* (SDWA) have resulted in additional chlorine based chemicals (disinfection by-products) being included in the BWSA variations that came into effect on 1 January 2005. These are Chloroacetic Acid, Dichloroacetic Acid and Trichloroacetic Acid. Melbourne Water also has requirements to meet service standards for the ESC starting from this time. Aluminium and turbidity are now regulated parameters under the SDWA and have been included in the BWSAs and ESC standards. Aluminium and turbidity are aesthetic rather than health based parameters.

During Quarter Two of 2007/08, Melbourne Water complied with the health parameters of the BWSA (*E.coli* and Trihalomethanes and Haloacetic Acids).

The turbidity failure in Quarter Two is a continuation from the previous quarter and is a function of changed water use during drought recovery with an increased reliance on water from Silvan Reservoir which has a higher turbidity than the filtered sources. This failure was also due to the Upper Yarra incident with high turbidities experienced at the Yarra townships and also higher turbidity being experienced in Cardinia and Greenvale Reservoirs due to wind action on exposed banks.

The soluble aluminium compliance also failed this quarter due to elevated results after pH stabilisation of the supply to Whittlesea. Investigations were carried out and no cause was determined for the high results with one sample being slightly above the Australian Drinking Water Guidelines guideline.

Detailed information on quarterly compliance against the indicators is given in the following sections.

Bulk Water Supply Agreements and Corporate Compliance Details

Plant Disinfection Reliability – Primary and Secondary Plants

Primary disinfection plants are those that disinfect water from systems open to the environment and contamination, such as major storage reservoirs.

Secondary disinfection plants are those that disinfect after the water has initially been treated by a primary plant. They disinfect within a closed system to control regrowth of bacteria in the pipe network.

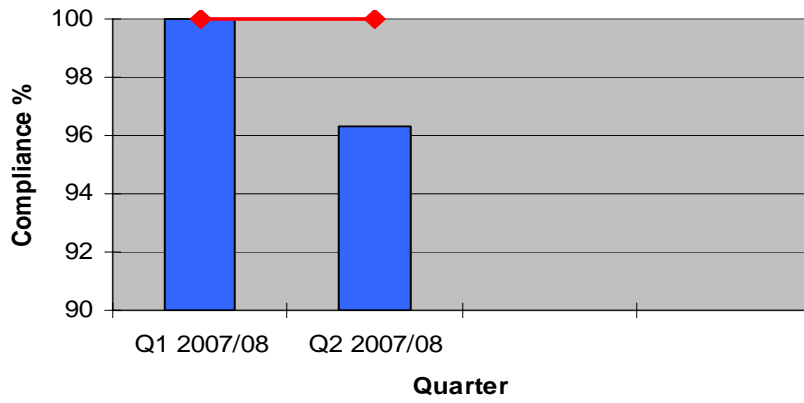
There are up to 37 primary and secondary plants included in the performance assessment for reliability compliance. The actual number in operation depends on system configuration during the quarter.

The established reliability measures for primary and secondary chlorination plants in operation are:

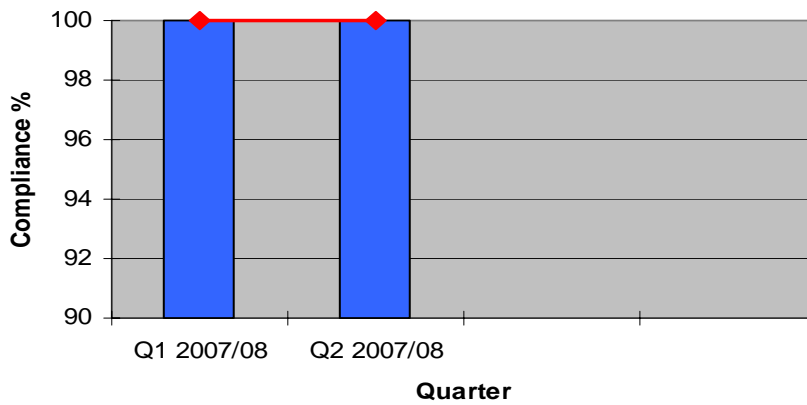
- Primary chlorinators meeting the chlorine contact time requirements for 99.9% of available operating time, and
- Secondary chlorinators within their operating range for 100% of available operating time

Melbourne Water has a target for 100% of all plants to meet the reliability measures. The target was not met in Quarter Two for Primary Disinfection Plant Reliability (see description in DRINKING WATER – Issues/Initiatives/Incidents).

Quarterly Treatment Plant Reliability Primary Chlorinators



Quarterly Treatment Plant Reliability Secondary Chlorinators

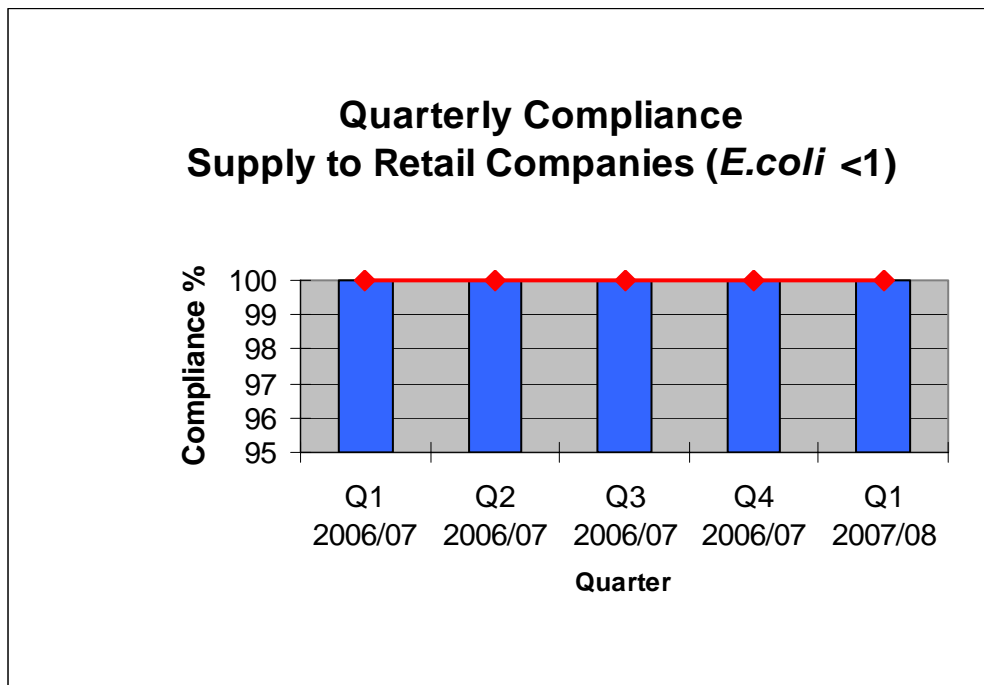


Supply to Retail Companies – E.coli

The overall objective is for no *Escherichia coli* (*E.coli*) to be present in the water supply system. 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 *E.coli* 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 transfer system. They are identified in the BWSAs with the retail water businesses.

Melbourne Water’s target is for 100% of the samples taken to be free from *E.coli*. It is more stringent than the requirements of the BWSAs that specify a target of 99% for each monitoring point. During Quarter Two this target was met.



Disinfection By-products - Trihalomethanes (THMs) and Haloacetic Acids

Trihalomethanes and the related haloacetic acids are present in drinking water principally as by-products of disinfection using chlorine. Some epidemiological studies have reported associations between the ingestion of chlorinated drinking water with a range of health matters including increased cancer rates.

The new Bulk Water Supply Agreements (BWSAs) with the retail water businesses contain targets for Haloacetic Acids that are more stringent than the Regulations in the *Safe Drinking Water Act 2003* (SDWA).

Routine sampling at selected sites is carried out to provide adequate data on the quality of water supplied to the retail water businesses. It is currently performed on a quarterly basis. An expanded monitoring program began in Quarter Two of 2004/05 at the time the SDWA came into effect. During Quarter Two of 2007/08 all targets were met.

Performance against Bulk Water Supply Agreement Targets

| Parameter | BWSA targets | Q3 2006/07 | Q4 2006/07 | Q1 2007/08 | Q2 2007/08 |
|-----------------------|--------------|---------------|---------------|---------------|---------------|
| Chloroacetic Acid | 0.15 mg/L | | | | |
| Dichloroacetic acid | 0.10 mg/L | | | | |
| Trichloroacetic acid | 0.10 mg/L | | | | |
| Total Trihalomethanes | 0.15 mg/L | | | | |

| | | | | | |
|------------|--|-------------------------|--|-----------------------------|--|
| Target met | | Action required & taken | | Action required & not taken | |
|------------|--|-------------------------|--|-----------------------------|--|

Other Chemical and Physical Parameters included in Bulk Water Supply Agreements (BWSAs) and reported to the Essential Services Commission (ESC)

The ESC service standards and the revised BWSAs have requirements for aluminium and turbidity, which are aesthetic rather than health based parameters.

The standards set by the BWSAs and ESC have different underlying concepts in that the BWSAs' assessment is on individual rolling average performance achieved at each sample site while the ESC performance measures are assessed on annual aggregates for all sites.

For aluminium, the ESC target is more stringent than in the SDWA regulations, which relate to retail customers' taps. For turbidity, targets are based on achieving or bettering recent historical performance. Performance against the ESC service standards is shown in the table.

During Quarter Two the targets for aluminium and turbidity were not met. The aluminium target was not met due to two samples exceeding the BWSA standard at Whittlesea. These samples are taken after the pH stabilisation plant at Yan Yean operated by United Utilities with there being no abnormal operation or flow spikes

occurring at this time. The source water is from the Winneke Treatment Plant with no elevated aluminium residuals being recorded from this source.

The turbidity failure was due to higher turbidity in the source water from Cardinia, Greenvale, Silvan and Upper Yarra Reservoirs. The recent drought resulted in lower storage levels and exposed banks in these reservoirs with wind action causing turbulence and resulting in higher turbidity levels. Heavy rainfall in late June produced very high inflows and an increase in turbidity in Upper Yarra Reservoir with fine colloidal particles being suspended in the water and not settling. This was an unprecedented event for this source and in response Melbourne Water is installing five emergency filtration plants for the townships in the Yarra Valley. The use of different source water during drought recovery into zones previously supplied with filtered water has also contributed to higher turbidity in the transfer system.

Performance against ESC service standards

| Parameter | Q3 2006/07 | Q4 2006/07 | Q1 2007/08 | Q2 2007/08 |
|----------------------|---------------|---------------|---------------|---------------|
| Aluminium (mg/litre) | | | | |
| Turbidity (NTU) | | | | |

NTU = Nephelometric Turbidity Units

| | | | |
|-----------------------------|--|--|--|
| Target met for this quarter | | Target not met for this quarter * (see note) | |
|-----------------------------|--|--|--|

Note: The ESC assesses compliance with these service standards on an annual basis, rather than for quarterly periods as shown above. Quarterly results are therefore an indication of likely annual compliance. However in the case of aluminium a single failure at any time will result in annual non-compliance as the Essential Services Commission (ESC) service standards contain a standard for “Aesthetic standards (aluminium)” of 99.88% of the aggregated number of samples from all monitoring points to comply with the BWSA provisions.

RECREATIONAL WATER ENVIRONMENT

Major Incidents/Initiatives/Issues

Yarra River Priority Project: Faecal Investigations – Ongoing study

This is a *Yarra River Action Plan* three-year investigation that initially targeted 52 sites on the Yarra River system below Warrandyte. These 52 sites comprised a screening investigation that ultimately led to additional screening investigations on Darebin, lower Gardiners, upper Gardiners, Scotchmans, Koonung and Merri Creeks. Screening investigations allow the identification of likely sources of faecal pollution whereupon more detailed investigations attempt to pinpoint sources, which can then be rectified. We are now in the last six months of this project.

Sewage contamination was evident after the upper Gardiners Creek screening investigation, where high levels of faecal indicator bacteria were observed emerging from Stott Street Main Drain (Burwood). By undertaking targeted follow-up sampling and following their noses, the sampling team discovered an overland sewage leak behind housing commission units adjacent to Wattle Park. Yarra Valley Water was notified and the problem quickly rectified.

A number of drains directly connected to the Yarra River were overlooked during the original 2005 screening investigation and another discovery came about via an investigation on these drains. A relatively small stormwater connection in Kew was observed flowing during dry weather and when sampled high levels of indicator bacteria were found. The problem was traced to faulty sewerage in Royal Talbot Rehabilitation Centre where centre management engaged a plumbing contractor to resolve the problem.

In May this year a drain walk by the sampling team identified sewage entering a council drain connected to Koonung Creek in Donvale. In the intervening months Yarra Valley Water completed CCTV inspections on several adjacent sewers and this quarter reported that a substantial fracture has been located in one of these sewers and the required remediation works scheduled.

Meanwhile a new approach has been adopted for screening Merri Creek. For sampling purposes, the creek was split into two halves longitudinally with screening of the first half completed before commencing the second half. The extra time allows for sampling of not only main drains, as has been the case with previous screening investigations, but all drains directly connected to the creek. In doing so, nearly half a dozen contaminated drains have been identified. Using the previous screening method these drains would have been overlooked.

An underground inspection of more than four kilometres of Fairfield Main Drain pinpointed several problems, most notably what appears to be sewage leaking from overlying sewer assets. In order to confirm this suspicion Yarra Valley Water agreed to CCTV their neighbouring sewers. Yarra Valley Water has also agreed to CCTV a sewer connection in Burwood where a CCTV inspection of a council stormwater drain revealed contamination to Eley Road West Main Drain, which connects to Gardiners Creek.

A review of Yarra Valley Water's data pertaining to unsewered properties showed a small collection of unsewered factories in Preston, immediately abutting Darebin Creek. A site visit revealed that only one property remained without a legal connection. Instead the factory had an *ad hoc* connection, held together with string and duct tape, running into their next door neighbour's property. Upon inspection, this connection had failed resulting in sewage discharging directly onto the hillside above the creek. Yarra Valley Water has agreed to investigate a method of connecting this property.

Statutory Compliance and Reporting

Melbourne Water has no existing statutory requirements for public health performance in regard to waterways. There are requirements for sewerage in the form of certain conditions that apply to the EPA Victoria (EPAV) licences for the Eastern and Western Treatment Plants. The key health parameter is *Escherichia coli* (*E.coli*), which is defined in Appendix 1.

Bacteriological Conditions of Receiving Waters Required under the EPA Victoria Licence - Eastern Treatment Plant.

Melbourne Water is required to monitor the effect of the treated wastewater discharged from the Eastern Treatment Plant on the bacteriological quality of the receiving waters near the point of discharge at Boags Rocks. Monitoring is carried out each week in the pipeline upstream of the actual discharge and at six designated locations along the foreshore, including Gunnamatta Beach. Licence requirements are for samples to be measured for *E.coli*.

- (a) Statutory Compliance and Reporting – Waste Discharge Sampling Point
The EPAV licence specifies annual median and 90th percentile performance limits of 200 org/100mL and 1000 org/100mL respectively, for *E.coli* at the discharge sampling point. The median and 90th percentile annual limits for 2006/07 were met.

Compliance with specified levels of E.coli

| Parameter | Compliance target |
|--|--------------------------|
| <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 EPAV Licence requires monitoring of the receiving environment in accordance with the Eastern Treatment Plant Environmental Improvement Plan, which is a component of the Licence. The objectives for receiving water quality are defined by the State environment protection policy (Waters of Victoria). The limit for *E.coli* specified in the policy for primary contact recreation is a median of not more than 150 org/100mL. The limits for Enterococci are a median and 75th percentile of 35 org/100mL and 150 org/100mL respectively (Appendix 2). For the second quarter of 2007/08, compliance with the State environment protection policy was met.

Reporting of Results in Accordance with Statutory Requirements

| Parameter | 2007/08 | | | |
|---------------------------------|----------------|-----------|-----------|-----------|
| | Q1 | Q2 | Q3 | Q4 |
| <i>E.coli</i> - median | | | | |
| Enterococci - median and 75%ile | | | | |

Reporting not required
Report required and submitted

Report required but not submitted

Bacteriological Conditions of Receiving Waters Required under the EPA Victoria Licence - Western Treatment Plant.

The EPAV licence for the Western Treatment Plant requires Melbourne Water to manage the effect of the discharge on the bacteriological conditions of the receiving waters of Port Phillip Bay. Long term monitoring has occurred at the actual discharges from the Plant and offshore at two locations, which are accessible from public roads. Samples are taken each week and measured for *E.coli*.

Statutory Compliance and Reporting

Before accreditation in August 2000, the EPAV licence required weekly monitoring for *E.coli* at the four discharge points. This practice has continued as an appropriate means of assessing operating performance. No guidelines or limits have been established and results are only required as part of the annual report to the EPAV in September each year.

Again, before accreditation, the EPAV Licence required monitoring at the two foreshore locations and reporting of results when limits were exceeded. These were a geometric mean of 1000 org/100mL and an 80th percentile of 2000 org/100mL over each 42 day period beginning 1 January of each year. Although this is not a specific requirement of the accredited licence, Melbourne Water continues this monitoring as part of the overall program and to measure performance against the State environment protection policy (Waters of Victoria). For the second quarter of 2007/08 both geometric mean and 80th percentile results were below the traditional targets and compliance with the State Environment Protection Policy was met.

Comparison of Results against Traditional Licence Requirements

| Parameter | 2007/08 | | | |
|---------------------------------|---------|----|----|----|
| | 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 | | | |

Meeting “State Environment Protection Policy” Objectives

As part of Melbourne Water’s long term Waterway Water Quality Monitoring Network, *Escherichia coli* (*E.coli*) is monitored at 73 sites with a more intensive weekly monitoring program in the Yarra and Maribyrnong Rivers (Yarra Watch) all year round and other key recreational sites in the summer.

The following information provides details on the levels of *E.coli* in Melbourne’s waterways using State Environment Protection Policy (SEPP) objectives as long-term targets. An explanation of *E.coli* as an indicator of contamination in relation to swimming is contained in Appendix Two.

A revised State Environment Protection Policy (Waters of Victoria) was issued in June 2003. Objectives are more stringent in an endeavour to improve water quality. New targets apply to the Melbourne Water region, excluding the Yarra and Western Port catchments, where regionally specific SEPPs are in force.

SEPP objectives are established according to the “beneficial uses” associated with a particular waterway. In the case of “primary contact recreation” involving direct contact with the water, there is a possibility that water may be ingested. The general policy objective for “primary contact recreation” is a median *E.coli* of <150 org/100mL, although it remains as a geometric mean of <200 org/100mL in the Yarra and Western Port catchment policies. In waterways where only “secondary contact recreation” occurs, the policy objective is less stringent.

This report uses a rolling twelve months of *E.coli* data and applies geometric means and 50th percentiles (medians) dependant on the particular SEPP for the waterway. Sites have been grouped by SEPP schedule rather than by regionally named catchments. Although comparison is made against SEPP, actual compliance is not assessed. However the use of monthly samples over 12 months gives a good indication of performance against the SEPPs - incorporating a range of seasons and a greater number of samples, similar to other environmental parameters in the SEPPs.

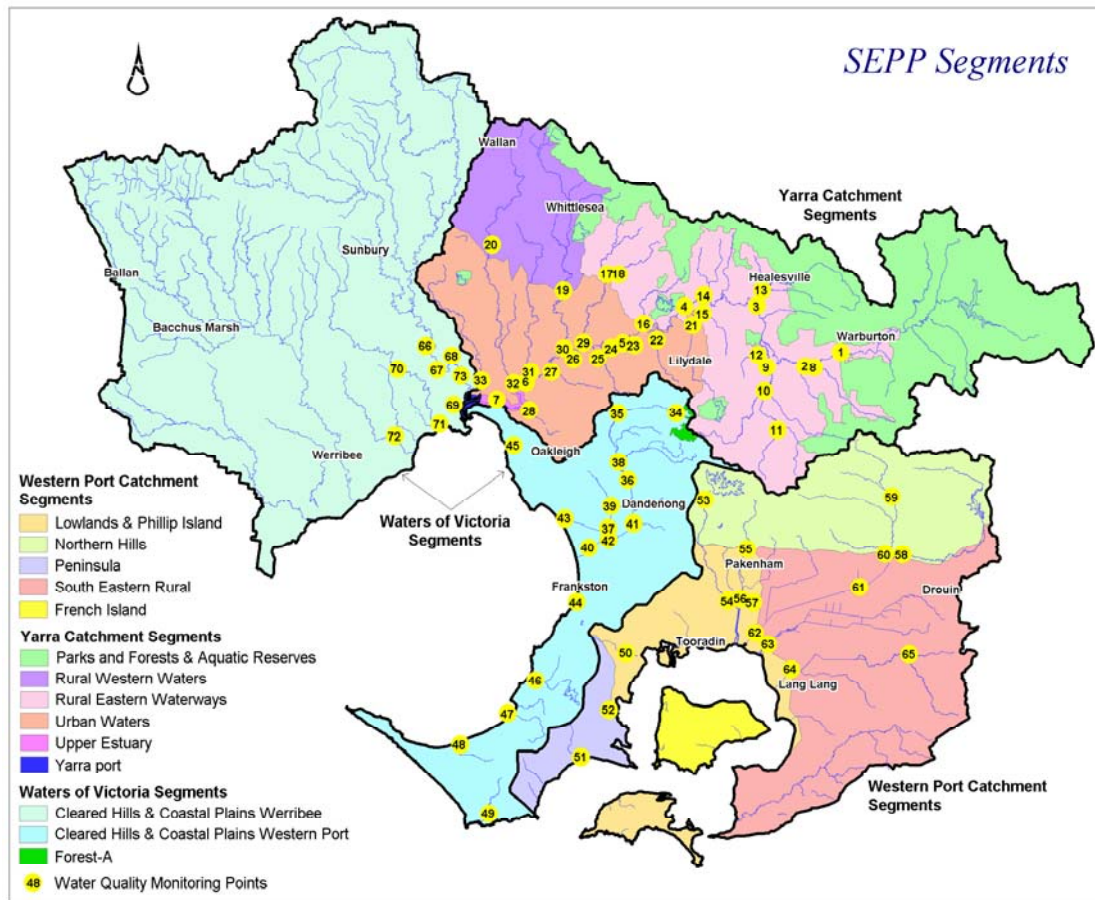
Monitoring regimes needed to assess true compliance, as specified in the SEPPs, would be:

- Waters of Victoria – ‘the median of five samples taken at regular intervals within 30 days’,
- Waters of Western Port and Catchment – ‘a 42 day geometric mean’, and
- Waters of the Yarra Catchment – ‘geometric mean of not less than five samples taken over a period of not more than 42 days’.

With Melbourne Water’s current program, it is only possible to determine true SEPP compliance using the Yarra Watch sites where results are obtained weekly. Yarra Watch results are provided later in this report.

A map of the SEPP segments and sampling points is also shown. An expanded monitoring program to cover the Werribee Cleared Hills and Coastal Plains Segment, now managed by Melbourne Water, is being developed.

Waterway Water Quality - Quarter Two 2007/08



Compliance Performance Number of sites and performance rating

| SEPP Schedule & Segments | No. of Sites | Q1 2007/08 | Q2 2007/08 | Q3 2007/08 | Q4 2007/08 |
|--|--------------|------------|------------|------------|------------|
| Waters of the Yarra Catchment | | | | | |
| # Rural Eastern Waters | 15 | 13 | 12 | | |
| # Rural Western Waters | 2 | 2 | 2 | | |
| # Upper Estuary | 1 | 0 | 0 | | |
| # Urban Waters | 15 | 3 | 3 | | |
| Waters of Victoria | | | | | |
| # Cleared Hills & Coastal Plains Werribee/ Maribyrnong | 8 | 5 | 5 | | |
| # Cleared Hills & Coastal Plains Western Port | 15 | 3 | 3 | | |
| # Forest-A | 1 | 1 | 1 | | |
| Waters of Western Port & Catchment | | | | | |
| # Lowlands & Phillip Island | 7 | 5 | 3 | | |
| # Northern Hills | 5 | 3 | 3 | | |
| # Peninsula | 1 | 1 | 0 | | |
| # South Eastern Rural | 3 | 1 | 0 | | |

Yarra Catchment SEPP Objective – *E.coli* Geometric mean 200 org/100mL

Waters of Victoria SEPP Objective – *E.coli* Median 150 org/100mL

Waters of Western Port SEPP Objective – *E.coli* Geometric mean 200 org/100mL

| | | | | |
|------------------------------|-----|--------|-------------|-----|
| Number of sites passing SEPP | Nil | < Half | = or > Half | All |
|------------------------------|-----|--------|-------------|-----|

Yarra Watch Program

The Yarra Watch Program, which commenced in March 2005, is separate from Melbourne Water's long-term routine monitoring program. Yarra Watch is designed to provide information to the public on the water quality trends in the Yarra River. It involves weekly sampling for *E. coli* at 12 Yarra River sites. The program is managed by Melbourne Water with results published on the Environment Protection Authority Victoria (EPAV) website (www.epa.vic.gov.au).

The State Environment Protection Policy (Waters of Victoria) sets a limit for microbial water quality for primary recreation of <200 *E.coli*/100mL, expressed as a 42 day geometric mean. As the sites on the Yarra River are sampled weekly, 5 weekly samples are considered acceptable for EPAV reporting. For Melbourne Water's reporting purposes, the results of all samples taken during the quarter (generally 13 samples) are used to calculate the geometric mean for each site. For comparison purposes, the annual geometric mean for each site for the previous financial year is also included in the reporting table.

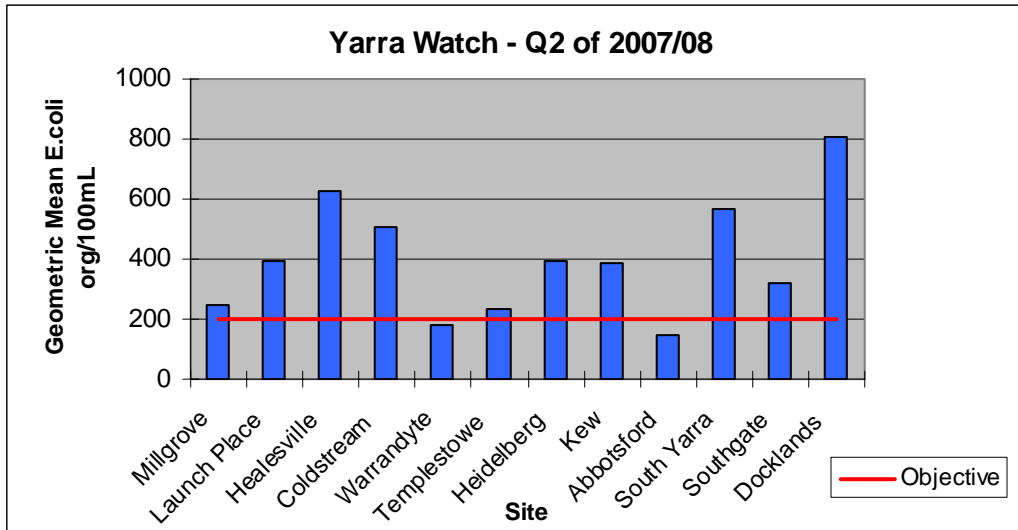
The Yarra Watch results for the quarter are shown below. During Quarter Two, EPAV issued stormwater advisory notices for the Lower, Middle and Upper Yarra River on four occasions following significant rainfall in November and December.

Yarra Watch Results for 2007/08

(Data source: EPAV web site)

| River Section | Sampling Site | Annual Geomean 2006/07 | 2007/08 | | | |
|---------------|-----------------|------------------------|---------|-----|----|----|
| | | | Q1 | Q2 | Q3 | Q4 |
| Lower Yarra | Docklands | 496 | 803 | 805 | | |
| | Southgate | 378 | 513 | 321 | | |
| | South Yarra | 560 | 448 | 569 | | |
| | Abbotsford | 197 | 185 | 149 | | |
| Middle Yarra | Kew | 444 | 362 | 389 | | |
| | Heidelberg | 308 | 247 | 393 | | |
| | Templestowe | 181 | 143 | 235 | | |
| | Warrandyte | 103 | 109 | 179 | | |
| Upper Yarra | Coldstream | 347 | 245 | 509 | | |
| | Healesville | 369 | 328 | 628 | | |
| | Launching Place | 314 | 213 | 391 | | |
| | Millgrove | 261 | 213 | 249 | | |

| | | | |
|------------------------------|--|------------------------|--|
| Complies with SEPP objective | | Exceeds SEPP objective | |
|------------------------------|--|------------------------|--|



All figures are *E.coli* calculated as geometric means in org/100mL
 Compliance is measured against the SEPP target for primary contact of a geometric mean for *E.coli* of 200 org/100mL. This target applies to all the listed sites. For secondary contact the target is a geometric mean of 1000 org/100mL

RECYCLED WATER

Major Incidents/Initiatives/Issues.

There were no significant health compliance matters during Quarter Two.

WERRIBEE AGRICULTURE

Major Incidents/Initiatives/Issues.

There were no significant health compliance matters during Quarter Two.

Statutory Compliance

Compliance with Livestock Disease Control Act 1994

During the quarter, all cattle sales conducted by Werribee Agriculture complied with S.44 (1) of the *Livestock Disease Control Act 1994*.

APPENDICES

Appendix One: Guide to Terms

| Term/Parameter | Unit | Definition |
|--|-------------------------------|--|
| <i>Escherichia coli</i> <i>E.coli</i> | Number of organisms per 100mL | A common bacterium from the intestines of warm-blooded animals including humans. Used as the primary microbial indicator of faecal contamination. For drinking water, performance is assessed by the percentage of samples with <i>E.coli</i> less than 1 organism per 100 mL of water at entry and monitoring points. |
| Enterococci | Number of organisms per 100mL | A group of bacteria found in the gastrointestinal tract of warm-blooded animals. Recognised as the best microbial indicator for measuring faecal contamination of marine recreational waters. Quality is assessed using the total number of organisms per 100 mL of water at beach sampling points. |

Appendix Two: Bacterial indicators

Escherichia 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 water. It is the most reliable indicator organism for detecting any faecal contamination in drinking water supplies.

For recreational waters both *E.coli* and enterococci are used as bacterial indicator organisms. Melbourne Water monitors waterways and receiving waters for the presence of *E.coli* through the Water Quality Monitoring Network and Licence Monitoring programs. Measurement of enterococci provides the best bacterial indicator of faecal contamination of marine recreational waters. EPA Victoria monitors enterococci at Port Phillip Bay beaches as part of the annual Beach Report program. Scientific studies have demonstrated an association between enterococci and the degree of health risk to swimmers. The overall risk of illness from swimming in the Bay is low.

State environment protection policies include acceptable levels of *E.coli* (and enterococci) for swimming. In the event of unacceptable results, EPA Victoria makes a recommendation to local Councils and the general public to avoid swimming in the contaminated area.

A revised State environment protection policy (Waters of Victoria) was issued in June 2003 and EPA Victoria has adopted the water quality guidelines in the "Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000". In these, the primary contact guideline for *E.coli* is for a median of five samples over one month being <150 org/100mL (as against a geometric mean of <200 org/100mL). This change to *E.coli* will have no impact in regard to Melbourne Water's marine

discharges but may impact the long-term attainment of State environment protection policy water quality objectives in waterways.

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, birds, herbivores, septic tank outflows and sewage spills.

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

Melbourne Water conducts algal bloom monitoring of water bodies under its control and has algal bloom response plans in place. The water bodies include water supply reservoirs, sewage treatment lagoons, retarding basins and recreational lakes.

Water bodies are selected for monitoring on the basis of history of incidence, susceptibility to blooms and potential consequences. If a bloom of 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 Sustainability and Environment (DSE) is the state wide 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, i.e. 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, Melbourne Water and DSE regions. Melbourne Water, through the Infrastructure 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 DSE, Department of Human Services and the relevant convening agency are informed in writing by the authority responsible for the waterway or water body in question.