DRINKING WATER INCIDENTS: THE REGULATOR'S PERSPECTIVE

Paper Presented by:

Nigel Garson

Authors:

Nigel Garson, *Senior Project Officer,*
Claire Tallis, *Senior Project Officer,*

Office of the Water Supply Regulator, DERM Qld

35th Annual Qld Water Industry Operations Workshop
Community Sports Centre, CQ University, Rockhampton
22 to 24 June, 2010

DRINKING WATER INCIDENTS: THE REGULATOR'S PERSPECTIVE

Nigel Garson, *Senior Project Officer,* Office of the Water Supply Regulator, DERM
Claire Tallis, *Senior Project Officer,* Office of the Water Supply Regulator, DERM

ABSTRACT

In July 2008, the Queensland State Government introduced new legislation for regulating recycled and drinking water quality. The *Water Supply (Safety and Reliability) Act 2008* aims to further strengthen the safety and reliability of Queensland's water supplies.

This paper explains how the requirements for drinking water have been implemented, what the Office of the Water Supply Regulator (OWSR) has learnt along the way and what industry improvements have been observed from OWSR's perspective.

KEY WORDS

Drinking water regulation, water quality management plan, incidents

1.0 INTRODUCTION

The *Water Supply (Safety and Reliability) Act 2008* (the Act) introduced the first specific regulatory requirements for managing the quality of drinking water in Queensland. Amendments to the *Public Health Act 2005* were also introduced to support the provisions of the Act.

The *Water Supply (Safety and Reliability) Act 2008* is administered by the Department of Environment and Resource Management (DERM) through the Office of the Water Supply Regulator (OWSR). The drinking water provisions apply to drinking water service providers (providers) who own infrastructure for treating, transmitting or reticulating water for drinking purposes and is charged for.

Prior to the introduction of the Act, some providers voluntarily used the Australian Drinking Water Guidelines (2004) (ADWG) as a framework for providing safe drinking water to customers. Providers also used the guideline values in the ADWG as a reference to determine the quality of drinking water they supplied. Whilst the new regulatory requirements have formalised the adoption of certain health related water quality guideline values found in the ADWG, this document remains a valuable reference for providers in terms of water quality and management.

In recognition of the impacts of the Act on the drinking water industry, implementation of the requirements is occurring in two stages. Stage 1 commenced in January 2009 and required drinking water service providers to:

- monitor water quality in their drinking water schemes
- report all drinking water incidents to OWSR
- submit drinking water quality reports on a quarterly basis, summarising their water quality monitoring results.

Stage 1 monitoring and reporting has and will continue to give providers valuable information which can be used to evaluate the hazards and risks associated with their supplies.

Stage 2 of implementation requires providers to develop and implement a drinking water quality management plan (DWQMP) to identify and manage public health related risks associated with their supplies.

As occurs when any new regulatory system is introduced, some time is required to achieve ongoing compliance. The purpose of this paper is to:

- highlight some areas of regulation requiring closer attention by drinking water service providers
- highlight some industry improvements from the OWSR's perspective that have occurred since the introduction of the legislation
- outline some improvements being developed by DERM.

2.0 DISCUSSION

2.1 Range of Drinking Water Schemes

Currently there are 384 drinking water schemes, owned by 84 registered providers across Queensland. These service populations ranging from two to greater than 100,000. A range of water sources are currently used including artesian bores, groundwater, surface water and desalinated sea water as shown in Figure 1.

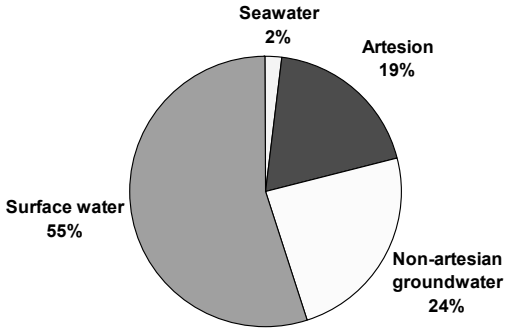

Figure 1: ***Water sources used by drinking water schemes in Queensland***

The extent of treatment used varies widely across the State, from supplies with no treatment and those that are only disinfected, to supplies with multiple treatment stages. In many cases, the risks associated with the supply can be directly related to the extent of treatment used. For example, the risks associated with schemes using surface sources without, at a minimum, filtration and disinfection will be higher than the risks associated with surface water sources that are subjected to multiple treatment steps. Figure 2 shows that 14 per cent of schemes with surface water sources have no treatment or use disinfection only. By requiring providers to report incidents and monitoring summaries, DERM has been able to identify issues and locations that need particular attention to improve water quality outcomes and ensure public health is protected.

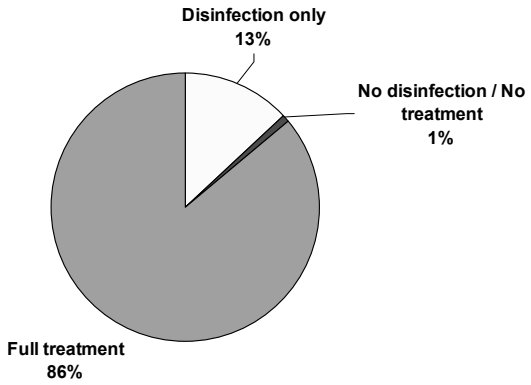

Figure 2: ***Level of drinking water treatment of surface water sources in Queensland. Full treatment means at least filtration and disinfection.***

2.2 Drinking Water Quality Incidents

The Notice issued to providers in December 2008 requires them to report the following drinking water incidents:

- detection of *Escherichia coli* (*E. coli*)
- detection of a pathogen
- detection of a chemical parameter that does not meet a health guideline value in the ADWG
- detection of radioactivity exceeding gross alpha or gross beta screening values in the ADWG
- detection of a parameter for which there is no guideline value in the ADWG
- an event or series of events likely to affect drinking water quality or will cause difficulty in the ability to adequately treat or provide drinking water.

2.3 The role of the OWSR when an incident is reported

When an incident is reported, OWSR works in collaboration with Queensland Health (QH) to ensure that providers take corrective and preventative actions to manage the incident and ensures that these actions are appropriate to protect public health.

For example when providers phone OWSR to report an incident they are asked questions such as when and where the sample was taken, what immediate action has been taken and what investigations are being implemented. In the early days of incident reporting, some providers had assigned the reporting role to staff who sometimes did not have all the required information, specifically about operational responses, to be able to outline what was being done to investigate the incident or what corrective actions were being implemented. Many providers have now also improved the pathways for prompt receipt and distribution of water quality results to staff with the experience and authority to implement a response.

OWSR provides a daily summary of all incidents to QH regional Population Health Units but will consult with QH immediately for advice or joint action where there may be an immediate risk to public health. Whilst OWSR will generally lead communications with providers during incidents, where QH considers that there are immediate and significant risks to public health, they will assume the role of lead communicator and inform OWSR of incident progress.

In all cases, as OWSR is the regulator for the *Water Supply (Safety and Reliability) Act 2008* and all relevant forms, such as Part A and Part B of the incident report must still be submitted to OWSR. Protocols have been developed between QH and OWSR to define roles and responsibilities and minimise duplication of reporting for providers.

The relationship between OWSR staff and provider's staff has developed over time and has achieved a level of interaction that supports a partnership approach to resolving drinking water quality issues. This recognises that at all times the provider is ultimately responsible for the quality of the water they supply and the provider has the best knowledge of their own systems. OWSR is responsible for ensuring that appropriate action is taken to protect public health. The balance between the regulatory role and provision of support to operational staff has been generally well received by providers. This especially seems to be the case for smaller remote providers where fewer staff are involved in the operation of the drinking water service.

2.4 Results of 2009 Drinking Water Incident Reporting

E. coli detections were the most common cause of incidents reported at about 74 per cent of the total.

The common causes of *E. coli* contamination identified through provider's investigations were:

- inappropriate, or no water treatment or disinfection to cope with water quality variability
- chlorinator or other equipment failure
- reservoir contamination
- inappropriate sampling technique.

No other incident cause accounted for more than 10% of the total incidents reported.

2.5 Improvements to Reporting of Event Incidents

The notification of an incident based on laboratory results are self explanatory, however the circumstances for notifying an event as an incident are less clear. Currently the reportable incident definition includes *'an event or series of events likely to affect drinking water quality or will cause difficulty in ability to adequately treat or provide drinking water'*.

OWSR believes that the number of event incidents may be being under-reported, in part due to the lack of a clearer definition and uncertainty among providers as to what should be reported. In the early days of mandatory incident reporting, events such as equipment breakdown were sometimes not reported until failed water quality results were known. Compounding the problem, the laboratory results often took several days or weeks to be returned to providers and no actions had been taken to protect public health in the interim.

An event does not have to be reported where standard responses are able to isolate suspect water or where normal operational monitoring indicates there is an issue and triggers actions that can manage the risks. However, where the issue is unable to be managed through normal operating responses or the provider has any uncertainty regarding the required response, the OWSR should be informed.

The reporting of an event demonstrates that precautionary measures are being implemented whilst investigations verify whether water safety has been compromised.

An example of a reportable event is illustrated by the following hypothetical incident.
A water treatment plant operator noticed on a periodic site inspection that the chlorine dosing pump had encountered a 'gas-lock', indicating that non-disinfected water may have been reticulated for sometime since the previous inspection. The operator rectified the fault immediately. Routine E. coli sampling was then performed a few days later as per the normal scheduled frequency.

This failure of the disinfection system was likely to have compromised the safety of the drinking water. The time the failure occurred was unable to be pin-pointed and may make it difficult to determine how much water had been reticulated since the failure occurred. Therefore, providers must report scenarios like this to OWSR immediately as an event incident and undertake actions to manage the risks. In this case, what has often happened is that providers have not reported the event and instead waited for the results of *E. coli* sampling to report any detections as an incident. Flushing reticulation after the subsequent detection is not an effective response especially where one week could have elapsed since the sample was taken. This does not demonstrate a timely and proactive response consistent with protecting public health.

Event sampling, in addition to routine sampling, verifies that the measures taken to manage the event are effective in controlling challenges to the water supply system. Event sampling analysis results are also particularly useful to assist providers in developing a DWQMP to manage water quality risks. For example, conducting extra sampling during a flood event will provide useful information to ensure a satisfactory chlorine residual is maintained during times when increased dissolved matter causes greater chlorine demand.

2.6 Observed improvements in managing water quality

In general, providers have a better awareness of the operation of their drinking water schemes and staff capacity, as a result of the increased focus on drinking water quality brought about by the introduction of the regulatory requirements. Specific industry improvements that have been observed include:

- increased frequency of verification monitoring and operational monitoring
- review of the rigor of ‘old’ sampling programs
- equipment upgrades and maintenance program improvements
- increased staff training and support to operational staff within providers
- increased feedback to management within providers about water quality issues
- decreased time before corrective actions are taken when incidents occur
- increased reassurance that incident responses being taken are appropriate
- increased ability to justify potential improvements in budget planning.

2.7 What improvements are being developed by DERM?

The notice issued to each provider in December 2008, detailing requirements for drinking water quality monitoring and reporting applies only until a provider has an approved DWQMP. OWSR will be looking at mechanisms to continue incident and water quality reporting after DWQMPs are in place. This may occur for example, through legislative amendments or conditions attached to a DWQMP.

Providers can be assured the processes that providers have put in place to comply with the notice will be able to be used to ensure compliance into the future.

There are a number of supporting documents and tools currently under development / review that will assist providers to continue to meet the regulatory requirements. A review is being undertaken of the draft *Water Quality and Reporting Guideline for a Drinking Water Service* following feedback from providers. This draft guideline was released in December 2008 prior to the commencement of the drinking water regulation. The revised guideline will be made available on the website in mid-late 2010. Providers should continue to use the draft guideline in the interim.

A draft Drinking Water Quality Management Plan Guideline for preparing a DWQMP will be released for consultation in early July. Whilst the initial focus is on large providers as they are the first required to have an approved DWQMP by 1 July 2011, all providers are welcome to review and provide comments on the Guideline. The assessment criteria that will be used by OWSR to assess DWQMPs will also be available to assist providers to check their plan against the requirements of the Act prior to submission to OWSR.

Further into the future, OWSR will be looking at developing additional guidelines (eg: for auditing and review of DWQMPs) and support programs for providers (eg: face to face visits, regular formal updates, teleconferences, etc) however, the details for these activities are yet to be scoped. DERM is also looking at integrating the DWQMP requirements with other asset regulatory arrangements to reduce costs to providers and OWSR.

3.0 CONCLUSION

In summary, the standard of drinking water services is highly variable around Queensland. It appears that regulation of drinking water providers needs to be further supplemented by a range of support actions to achieve desired outcomes in relation to drinking water quality. Drinking water regulation is achieving improvement in water quality through a greater focus on drinking water quality management.

4.0 ACKNOWLEDGEMENTS

The authors would like to thank Anne Gardiner and Toni Stiles of OWSR for their kind assistance in the preparation of this paper.

5.0 REFERENCES

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