Fluoridation Committee
Annual Report
2012-13
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## Introduction

This report was prepared in accordance with section 17(2) of the Fluoridation Act 1968 (the Act).

Water fluoridation is the adjustment of fluoride in drinking water to a concentration that helps prevent dental decay. The National Health and Medical Research Council (NHMRC) affirms that water fluoridation remains the most socially equitable method of achieving community-wide exposure to the health benefits of fluoride. Adjusting fluoride levels to the NHMRC-recommended levels in public water supplies has proven a safe and effective measure in the prevention of dental health problems.

Water fluoridation receives endorsement by more than 150 science and health organisations worldwide and fluoridation programs have the strong support of the NHMRC, the World Dental Federation, the International Association for Dental Research and the World Health Organisation.

The National Oral Health Plan 2004-2013 suggested that for each dollar invested in water fluoridation the savings in dental treatment costs range from $12 to $80. Comparable financial data are not available for Tasmania however in Victoria in the past 25 years, fluoridation is estimated to have saved the Community nearly $1 billion in avoided dental costs, lost productivity and saved leisure time. Given the improvements in oral health and reductions in associated health costs, State and Territory governments intend to extend their fluoridation programs under the National Oral Health Plan 2004-2013.

In Tasmania, 88% of the population receives fluoridated drinking water. With the exceptions of Scamander, Fingal and Bicheno all public water supply systems servicing communities above 1000 in population within Tasmania are fluoridated in accordance with the National Oral Health Plan 2004-2013.

Fluoridation of Tasmanian public drinking water supply systems commenced in 1953 (in Beaconsfield), making Tasmania the earliest jurisdiction to do so. Under the Fluoridation Act 1968, the Minister for Health directs the Water Corporations (based on recommendations from the Fluoridation Committee) to fluoridate specific public water supplies in a prescribed manner. Included in this Ministerial Direction is the need to monitor the level of fluoride in drinking water on a daily basis.

The Fluoridation Committee’s Annual Report 2012-13 is the fourth reporting period in which the Water Corporations are the owners and service providers of fluoridation assets and water fluoridation respectively. The role of the Department of Health and Human Services (DHHS) remains as the regulatory body with strategic oversight being provided by the Fluoridation Committee.

The three Regional Water Corporations (Ben Lomond Water, Cradle Mountain Water and Southern Water) amalgamated into a single Water Corporation (TasWater) on 1 July 2013. As this report covers the period preceding this amalgamation it has been written to reflect the operations of the three former Water Corporations.

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2 The Fluoridation Committee

The Fluoridation Committee consists of five members, each appointed by the Minister for Health. The principal functions of the Fluoridation Committee are to act as an expert advisory committee to interested parties including the Minister, on matters relating to fluoridation of drinking water and to provide strategic oversight of fluoridation works in Tasmania and report on the performance and outcomes of the fluoridation plants throughout the state.

For 2012-13 the Fluoridation Committee members were:

- Mr Stuart Heggie, State Manager of Environmental Health Services, Department of Health and Human Services (Chair).
- Mr Bill (Kai Chye) Ho, Manager Water and Sewerage, New South Wales Office of Water.
- Dr David Butler, Director Clinical Services, Oral Health Services, Department of Health and Human Services (resigned November 2012). A replacement registered dentist was not able to be appointed until the 2013-14 reporting period.
- Dr John O’Reilly, Section Head – Inorganic Chemistry (Metals), Department of Primary Industries, Parks, Water and Environment.
- Dr Martin Bicevskis, retired registered medical practitioner (resigned December 2012)
- Dr Mark Veitch, Senior Medical Advisor, Public and Environmental Health Services, Department of Health and Human Services (commenced December 2012).

Mr Cameron Dalgleish, State Water Officer, Department of Health and Human Services also attends the meetings in an administrative capacity.

Meetings of the Fluoridation Committee were held:

- 3 October 2012
- 12 December 2012
- 15 May 2013

A meeting was not held in March 2013 owing to two notable public health emergencies being managed by key personnel from DHHS in the preceding weeks and months. These were the Tasmanian Bushfires on the Tasman Peninsula and the lead contamination of rainwater tanks from a local manufacturer.
3 Achievements in 2012-2013

The following are the key achievements in the implementation of water fluoridation during 2012-13:

- Ongoing replacement and standardisation of fluoridation equipment across the sites to facilitate management and maintenance;

- Significant contractual arrangements put in place by the Regional Water Corporations to strengthen arrangements for the surety of supply of fluoridating agents;

- Ongoing development of contingency supply plans for the fluoridating agents;

- Ongoing investigations in conjunction with the EPA into industries emitting fluoride in air emissions;

- Finalisation of the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies. This will be issued during the 2013-14;

- Improved level of fluoride added to the water from the Box Hill (National Park) Fluoridation Station which contributes to the greater Hobart area water supply. (Further improvement has occurred since the reporting period);

- Commissioning of new Water Treatment Plant at Waratah (Cradle Mountain Water) including fluoridation of the supply;

- Commissioning of new Water Treatment Plant at Queenstown (Cradle Mountain Water) including fluoridation of the supply; plus decommissioning of the poorly performing Hurst Street fluoridation plant;

- Fluoridation of the Ross Water Supply as serviced by an extension from the existing Campbell Town Water Treatment Plant.
4 Fluoridation Plant Status and Performance

4.1 Fluoridation Plant Status

There were 40 operating fluoridation plants in Tasmania during the reporting period of 2012-13 with only 39 operational plants at the end of the reporting period. In Cradle Mountain Water’s area Cutten Street in Queenstown was not operational during 2012-13 with the supply being fluoridated from the Hurst Street fluoridation plant and later replaced by the Queenstown fluoridation plant. The Waratah fluoridation plant was commissioned during 2012-13 and accounts for the absolute increase in the number of fluoridation plants reported in 2011-12 (which was 39). These plants are designed to provide fluoridated drinking water to approximately 87 per cent of the Tasmanian population. This is a significant proportion as public drinking water supplies provide reticulated water to approximately 89 per cent of the population. In other words fluoridation is provided to 97 per cent of Tasmanians that receive a reticulated water supply.

Twenty two plants use sodium fluoride (NaF), which is a white material available as an odourless powder or in a crystalline form. Fluoridation is accomplished by dissolving the sodium fluoride in water. To minimise occupational health and safety issues, the Fluoridation Committee has approved the use of soluble bags made of Poly Vinyl Alcohol (PVA) for the addition of sodium fluoride to drinking water. Two of these plants utilise fluorodose to operate a sodium fluoride saturator system for fluoride dosing.

Eighteen plants use Fluorosilicic acid (H₂SiF₆), commonly known as FSA. FSA has advantages with regard to dosing accuracy and economics and is in use in most of the large water treatment plants around the State. The use of automated dosing systems to add FSA to water significantly reduces occupational health and safety issues. FSA is an extremely corrosive and volatile liquid with a pH level of 1.2 that can lower the pH of drinking water if the water does not have sufficient buffering capacity to neutralise the effect of this acidic fluoridating agent.

4.2 Fluoridation Plant Performance

Under the Fluoridation (Interim) Regulations 2009, the Regional Water Corporations must maintain and operate fluoridation plants to ensure compliance with the following performance specifications:

- The fluoridation concentration range required in the drinking water supply is 0.8 to 1.2 mg/L of fluoride
- The maximum level of fluoride allowed in the water is 1.5 mg/L. (This latter maximum level is based on the Australian Drinking Water Guideline health limit)

Additionally under the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2007-2010, the Regional Water Corporations must maintain and operate fluoridation plants to ensure compliance with the following performance specifications:

- Meet a target over a calendar year, that greater than 90 per cent of all routine fluoride samples (both treated and distributed) fall within the fluoride concentration operating range of 0.8 mg/L to 1.2 mg/L.

All three Regional Water Corporations submitted monthly performance reports during 2012-13.

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4.2.1 Average Fluoride Concentrations

The first measure of compliance is that all daily fluoride concentrations are averaged over the reporting period with the resultant average monthly fluoride concentration being assessed as compliant if it falls within the operating target range of 0.8-1.2 mg/L. Table 1 shows that 38 of the 40 fluoridation plants that operated throughout 2012-13 maintained an average fluoride dose within the required fluoride concentration range of 0.8 mg/L to 1.2 mg/L. The graphical performance of each of the Regional Water Corporations can be seen in **Error! Reference source not found.** for Southern Water, Figure 2 for Cradle Mountain Water and Figure 3 for Ben Lomond Water.

<table>
<thead>
<tr>
<th>Water supplier</th>
<th>Number of fluoridation plants</th>
<th>Number of fluoridation plants that complied with the yearly average prescribed fluoride concentration range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ben Lomond Water</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Cradle Mountain Water</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Southern Water</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>38</strong></td>
</tr>
</tbody>
</table>

*Table 1: Compliance of fluoridation plants – average fluoride concentrations*

This compares with 33 of 39 compliant fluoridation plants in 2011-12 and 36 of 39 in 2010-11. The non-compliant fluoridation plants failed to add sufficient fluoride to achieve the optimum fluoride range in the water supply.

The following non-compliant plants were noted during the 2012-13 reporting period with their average fluoride concentration given:

1. Bridport (Ben Lomond Water) = 0.79 mg/L;
2. St Marys (Ben Lomond Water) = 0.76 mg/L.
**Figure 1**: Average fluoride concentration\(^4\) for SW operated fluoridation plants (error bars show standard deviation)

\(^4\) Average of all daily samples taken for the 2012-13 year
Figure 2: Average fluoride concentration\(^5\) for CMW operated fluoridation plants (error bars show standard deviation)

\(^5\) Average of all daily samples taken for the 2012-13 year
Figure 3: Average fluoride concentration for BLW operated fluoridation plants (error bars show standard deviation)

\[\text{Average of all daily samples taken for the 2021-13 year}\]
4.2.2 Daily Fluoride Concentrations

The second measure of compliance assesses the percentage of individual reported fluoride concentrations (on a daily basis) that fall within the operating target range of 0.8-1.2 mg/L. The Code of Practice sets 90% as the compliance standard for this assessment. Error! Reference source not found. shows that 23 of the 40 fluoridation plants that operated throughout 2012-13 exhibited compliance against this measure. Graphically the compliance of each of the Regional Water Corporations can be seen in Figure 4 for Southern Water, Figure 5 for Cradle Mountain Water and Figure 6 for Ben Lomond Water.

<table>
<thead>
<tr>
<th>Water supplier</th>
<th>Number of fluoridation plants</th>
<th>Number of fluoridation plants that complied with the 90% of daily results within the prescribed fluoride concentration range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ben Lomond Water</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>Cradle Mountain Water</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>Southern Water</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 2: Compliance of fluoridation plants – daily fluoride concentrations

The following non-compliant plants were noted during the 2012-13 reporting period with their average compliance given:

1. Box Hill (Southern Water) = 80.5%
2. Fern Tree (Southern Water) = 64.6%
3. Huonville (Southern Water) = 87.9%
4. Merton (Southern Water) = 67.5%
5. Swansea (Southern Water) = 88.8%
6. Triabunna (Southern Water) = 89.4%
7. Gawler (Cradle Mountain Water) = 79.7%
8. Howard Street Queenstown (Cradle Mountain Water) = 82.7%
9. Queenstown (Cradle Mountain Water) = 68.9%
10. Strahan (Cradle Mountain Water) = 83.4%
11. Zeehan (Cradle Mountain Water) = 78.1%
12. Bridport (Ben Lomond Water) = 59.1%
13. Campbell Town (Ben Lomond Water) = 64.7%
14. Chimney Saddle (Ben Lomond Water) = 84.1%
15. Deloraine (Ben Lomond Water) = 85.6%
16. Distillery Creek (Ben Lomond Water) = 85.6%
17. Longford (Ben Lomond Water) = 80.7%
18. St Marys (Ben Lomond Water) = 45.6%
19. Westbury (Ben Lomond Water) = 74.7%
It should be noted that the two different measures of compliance cannot be directly compared as it is possible to exhibit compliance with one measure and not the other. For example, the Box Hill fluoridation plant operated by Southern Water reported an average yearly fluoride concentration of 0.96 mg/L and was thus assessed as being compliant. However, the reported concentrations were only within the target operating range for 80.5 per cent of the reported figures and are thus shown as non-compliant for this measurement of compliance.
Compliance is measured as the percentage of daily fluoride concentrations that fall within the operating target range of 0.8 – 1.2 mg/L.

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Figure 4: Compliance of SW Fluoridation plants (error bars show standard deviation)
Figure 5: Compliance\(^a\) of CMW Fluoridation plants (error bars show standard deviation)

\(^a\) Compliance is measured as the percentage of daily fluoride concentrations that fall within the operating target range of 0.8 – 1.2 mg/L
Figure 6: Compliance\(^9\) of BLW Fluoridation plants (error bars show standard deviation)

\(^9\) Compliance is measured as the percentage of daily fluoride concentrations that fall within the operating target range of 0.8 – 1.2 mg/L
4.3 Cradle Mountain Water Fluoridation Plants

Cradle Mountain Water undertook a risk assessment of all their fluoridation plants against the *Tasmanian Code of Practice for the Fluoridation of Public Water Supplies* between July and September 2012. They approached DHHS in late December and requested permission to suspend fluoridation operations at all of their plants whilst they developed a program to implement required works to reduce the identified OH&S, environmental and public health risks. DHHS did not agree to this request and required CMW to undertake a quantification of the risks to determine which were considered to be high risk. On Christmas Eve, CMW shut down all of their fluoridation plants and DHHS did not become aware of this until the December monthly report was submitted on 15 January 2013.

Remedial works were developed and sequentially implemented across some of the fluoride plants resulting in the reinstatement of dosing at the Waratah plant. As at 30 June 2013, this remained the only fluoridation plant currently dosing the treated water. All other plants remained off-line as CMW continued to refine and implement the required works at each of the sites.

With the exception of Waratah, the assessment of the CMW fluoridation plants were based on the period of time that they were operational (i.e. July 2013 to December 2013).
5 Future Activities

The following issues and activities will be progressed in 2013-14:

- Commissioning of the Lilydale water supply system via a pipeline from the Chimney Saddle Water Treatment Plant, which is a fluoridated supply;

- Commissioning of the Westbury Water Treatment Plant providing fluoridated water to both Westbury and Exton water supplies. Exton is currently an unfluoridated supply;

- Review, consultation and amendments to the Fluoridation (Interim) Regulations 2009;


- Continue to consider options to expand the provision of fluoridation of drinking water to numerous communities with populations greater than 500 which currently do not received a fluoridated water supply;

- Review and update of the three year strategic and implementation plan for the Fluoridation Committee;

- Development of a formal emergency plan for fluoride overdose incidents;

- Reinstatement of all the fluoridation systems formally managed by Cradle Mountain Water.