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) affirm 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 Queensland government undertook research which suggested that for each dollar invested in water fluoridation the savings in dental treatment costs range from $12 to $80. 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. In accordance with the National Oral Health Plan 2004-2013, public water supply systems servicing all communities above 1000 in population in Tasmania are fluoridated. The exceptions are Scamander (population of 1250), Fingal (1590) and Bicheno (1400).

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 for 2010-11 is the second reporting period in which the newly established 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) remained as the regulatory body with strategic oversight being provided by the Fluoridation Committee. This role-change is a result of amendments to the fluoridation legislation in 2008-2009, which was a consequence of the water and sewerage reforms in Tasmania.
The Fluoridation Committee

The Fluoridation Committee consists of five members, each appointed by the Minister for Health. The Deputy Director of Public Health (as a delegate of the Director of Public Health) occupies the position of committee chair. 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 stations throughout the state.

For 2009-10 the Fluoridation Committee members were:

- Dr Chrissie Pickin, Deputy Director of Public Health, Department of Health and Human Services.
- 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.
- Dr John O’Reilly Section Head – Inorganic Chemistry (Metals), Department of Primary Industries, Parks, Water and the Environment.
- Dr Martin Bicevskis, Senior Medical Officer (Occupational and Public Health), Department of Health and Human Services June 2009 – Dec 2009) and retired registered medical practitioner (Jan 2010 – current).

Mr Stuart Heggie, State Manager Environmental Health Services and Dr Raquel Esteban, State Water Officer also attends the meetings in an administrative capacity.

Meetings of the Fluoridation Committee were held:

- 13 October 2010
- 13 December 2010
- 23 February 2011
- 1 June 2011
Achievements in 2010-2011

The following are the key achievements in the implementation of water fluoridation during 2010-11:

- Noted improvement of fluoridation management across the board during the second year under the control of the Regional water Corporations;
- 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;
- Development of contingency supply plans for the fluoridating agents;
- Development of a Fluoridation Strategic Plan by the Fluoridation Committee;
- Technical advice provided to Southern Water by the Fluoridation Committee about the management and poor performance of the National park fluoridation system. This brought about the change in fluoridating agent from FSA to NaF;
- Preliminary investigations into other sources of fluoride from industries emitting particulate fluoride in air emissions in conjunction with the EPA.
Fluoridation Plant Status and Performance

Fluoridation Plant Status

There were 39 operating fluoridation plants in Tasmania for the reporting period of 2010-11. These plants are designed to provide fluoridated drinking water to approximately 88 per cent of the Tasmanian population. This is a significant proportion as public drinking water supplies provide reticulated water to approximately 91 per cent of the population.

This is the same number of operational fluoridation plants as reported during the 2009-10 reporting period.

Twenty-one 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 previously approved the use of soluble bags made of Poly Vinyl Alcohol (PVA) for the addition of sodium fluoride to drinking water.

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 have an effect on the pH of drinking water if the water does not have sufficient buffering capacity to neutralise the effect of this acidic fluoridating agent.

Fluoridation Plant Performance

Under the Fluoridation (Interim) Regulations 2009, the 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)

All three water corporations submitted monthly performance reports during 2010-11.

Table 1 shows that 36 of the 39 fluoridation systems that operated throughout 2010-11 maintained an average fluoride dose within the required fluoride concentration range of 0.8 mg/L to 1.2 mg/L. This compares with 35 of 39 compliant fluoridation systems in 2009-10 and 37 of 39 in 2008-09. Only Cradle Mountain Water achieved 100 per cent compliance of all the fluoridation systems in the north-west region and has been the case for at least the past three reporting periods. The non-compliant fluoridation systems achieved fluoride concentration doses below the optimum range.

The following non compliant systems were noted during the 2010-11 reporting period with their average fluoride concentration given:

1. National Park (Southern Water) = 0.43 mg/L;
2. Fern Tree (Southern Water) = 0.78 mg/L;
3. Campbell Town (Ben Lomond Water) = 0.63 mg/L.
Plant Reliability

Fluoridation plant reliability focuses on the level of failure/breakdown of the fluoridation systems. The Tasmanian Code of Practice for Fluoridation of Public Water Supplies (2007-10) recommends a reliability level of 95%. This means that the fluoridation system is operational for 95% of the time. The most common causes for low reliability are ageing equipment and/or a major malfunction, which can result in the system being offline for a significant period of time. Fluoridation systems which were not operational for a period of time for the purpose of upgrades and to address non-dosing issues (eg OH&S requirements) are not included in this measure.

Table 1 shows that during 2010-11, 34 of the 39 fluoridation systems had acceptable reliability, which is a decrease from the previous reporting period, when 35 of the 39 fluoridation systems achieved 95% or higher reliability. During 2008-09, 33 of the 39 fluoridation systems achieved 95% or higher reliability.

The following non compliant systems were noted during the 2010-11 reporting period with their plant reliability given:

1. National Park (Southern Water) = 69.2%;
2. Stirling Valley – Rosebery (Cradle Mountain Water) = 94.1%;
3. Scottsdale (Ben Lomond Water) = 60.7%;
4. Campbell Town (Ben Lomond Water) = 59.7%;
5. St Helens (Ben Lomond Water) = 92.2%.

Table 1 Compliance of fluoridation systems – fluoride concentration and plant reliability

<table>
<thead>
<tr>
<th>Water supplier</th>
<th>Number of fluoridation systems</th>
<th>Number of fluoridation systems that complied with the prescribed fluoride concentration range</th>
<th>Number of fluoridation plants with a reliability of 95 per cent or greater</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ben Lomond Water</td>
<td>12</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>Cradle Mountain Water</td>
<td>13</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>Southern Water</td>
<td>14</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>39</strong></td>
<td><strong>35</strong></td>
<td><strong>34</strong></td>
</tr>
</tbody>
</table>
**Future Activities**

The following issues and activities will be progressed in 2011-12:

- Completion of the installation and commissioning of the bulk sodium fluoride National Park plant which would allow optimisation of the fluoride dosing at this plant.
- Installation of an additional barrier of fail-safe devices to prevent siphoning and ensuring fluoride dosing equipment cannot occur unless water is flowing through the plant.
- Completion of the installation of a new switchboard and upgrade of the fluoride dosing equipment and associated controls at Bryn Estyn water treatment plant.
- Consultation with Southern Water to address the sub-optimal fluoride dosing at Ferntree and National Park.
- Review, consultation and amendments to the Fluoridation (Interim) Regulations 2009.
- Review and revise the Tasmanian Code of Practice for the Fluoridation of Public Drinking Water Supplies.
- Review the options to expand the provision of fluoridated drinking water to numerous communities with populations greater than 500 which currently do not received a fluoridated water supply.
- Implementation of a three year strategic and implementation plan for the Fluoridation Committee.
- Development of a formal emergency plan for fluoride overdose incidents.
- Fluoridation Committee to assess the fluoridation of the Waratah Water Supply.

As this Report is written retrospectively; the following activities; namely personnel movement can be foreshadowed for the 2011-12 reporting period:

- September 2011 – Resignation of Raquel Esteban from DHHS (State Water Officer);
- January 2012 – Commencement of Cameron Dalgleish with DHHS in the role of State Water Officer;
- May 2012 – Resignation of Dr Chrissie Pickin from DHHS (Deputy Director, Public Health and Chair of the Fluoridation Committee)
- May 2012 – Appointment of Stuart Heggie of DHHS (State Manager Environmental Health Services) into the role of Acting Chair of the Fluoridation Committee.