



LATE REPORTS TO COUNCIL

27 March 2018

Late Report #2 to Council

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REPORT TO COUNCIL

Department:	Infrastructure and Regulation
Submitted by:	Manager Waste, Water and Sewer
Reference/Subject:	Late Report #3 - Recent water quality issue regarding taste in the Uralla water supply

LINKAGE TO INTEGRATED PLANNING AND REPORTING FRAMEWORK

Goal:	3.4 Secure sustainable and environmentally sound water-cycle infrastructure and services.
Strategy:	3.4.1 Maintain and renew water network infrastructure to ensure the provision of secure, quality and reliable drinking water supplies.
Activity:	3.4.1.1 Provide water supply
Action:	Deliver Uralla and Bundarra water supply in compliance with the Drinking Water Quality Management Plan.

SUMMARY:

This report is summary about what caused the taste of Uralla's town water supply to generate complaints from some customers and the proposed way forward to mitigate future events.

OFFICER'S RECOMMENDATION:

That Council receive and note the report.

BACKGROUND:

Algal growth is associated with an 'earthy' or 'muddy' taste in drinking water. The algae produce the compounds Geosmin and Methyl-Isoborneol (MIB) which in turn provide for the earthy taste and odour.

Algal growth is triggered by climatic and catchment conditions. A heavy rain event in the upper parts of the Kentucky Creek along with persistently warm water temperatures in Kentucky Creek Dam, triggered the current increase in algal growth.

The water treatment plant servicing Uralla is of a conventional type that is limited in its capacity to remove Geosmin and MIB. Process flow diagram attached.

Hunter Water's website provides a succinct summary of the phenomena with selected extracts as follows.

"Geosmin and Methyl-Isoborneol (MIB) are naturally occurring compounds that have a very strong, earthy taste and odour. Geosmin can be detected by human noses at very low levels.

These compounds are generally present in drinking water, however not at noticeable levels.

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Generally, Geosmin becomes an aesthetic issue for customers when levels are in the range of 20-30 nanograms (one millionth of a milligram) per litre, but some people who are particularly sensitive may notice it at levels above 10.

What are the Effects of Geosmin and MIB?

Geosmin and MIB produce a musty, earthy smell and taste in drinking water, however are not harmful at levels present in drinking water.

What Causes Increased Levels of Geosmin and MIB?

Some kinds of algae and bacteria present in dams naturally produce Geosmin and MIB. Increased concentrations of these microorganisms can cause an increase in Geosmin and MIB concentrations above the taste and odour threshold.

What Can be Done About Geosmin and MIB?

Geosmin and MIB can not be removed from water using normal treatment processes.

Customers can add lemon juice and chill water with increased geosmin and MIB levels to improve the taste."

Algal events impacting taste and odour are an anticipated annual occurrence for the Uralla drinking water supply (Kentucky Creek Dam). In some years the event will occur more than once and in other years not at all.

In addition, the Kentucky Creek Dam is relatively shallow. A shallow water body that isn't well mixed is more vulnerable to algal growth.

REPORT:

Late On Tuesday the 6th of March 2018, rain fell in the upper catchment. No rainfall was recorded at the water treatment plant.

On Wednesday 7th March the water level of the dam had began to rise as a result of the rain event. The level of the dam was 450mm below the crest (an increase of 57 mm on the 5th March water level).

Council's operators first began managing water quality in response to the 'earthy' or muddy taste in the raw water on 8 March. As the taste was not persistent and no complaints were reported at this time, this was considered a once off.

Between the 14th March and up to the 21st Council received 20 complaints in relation to the taste and odour.

Council's treatment plant operations staff undertook the following steps to mitigate the impact of the Geosmin and MIB on the Council water supply;

- Operated the plant at times when the production of these compounds would be at its lowest (early hours of the morning);
- Cleaned the sedimentation tank;
- Extra backwashing of the filters;
- Increased the levels of dosing of powder activated carbon (PAC)
- Flushing of water supply lines in response to complaints, and
- Flushed the entire reticulation to freshen the water supply.

Given that the catchment is largely uncontrolled runoff into the impoundment will contain higher level of nutrients than would be expected in a pristine catchment.

Algae control using an algaecide such as copper sulphate requires special licences and has the potential to cause unintended environmental harm to other flora and fauna within the Kentucky Creek system.

Additionally the use of an alternative water supply is currently not an option.

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Alternative additional processes that could assist in the reduction of Geosmin and MIB to levels not noticeable in the water supply system include;

- De-stratification of the reservoir;
- Additional process step following sedimentation and prior to filtration involving dosing additional PAC with effective contact time to adsorb the Geosmin and MIB compounds and reduce to an acceptable level;
- Dosing with ozone; and
- Alternative interim water supply (groundwater).

It is proposed that a suitable water treatment consultant be engaged to investigate and propose a preferred solution and subsequent design.

Additionally, when becoming aware of the likelihood of the potential adverse taste and odour event due to Geosmin and MIB, Council should issue a public advice.

KEY ISSUES:

The development of an algal growth event within Uralla's water supply dam cannot be prevented. The complexity of the factors involved mean it is not possible to predict when an event may occur, or to know how long an event may last.

Available control measures appropriate to the matter at hand were put into effect early – in response to complaints called into the Council's customer service team.

The existing conventional treatment plant processes available at the Uralla treatment plant are unable to reduce the impact of high Geosmin and MIB levels.

A review of possible infrastructure processes and operational procedures (by external consultants) with a view to removal of Geosmin and MIB to acceptable levels will be listed for funding in 18/19 budget.

Insert Name **Stephanie McCaffrey**
Insert Title **Manager, Waste, Water and Sewer Services**

Prepared by staff member: Stephanie McCaffrey – Manager Waste, Water and Sewer
TRIM Reference Number:
Approved/Reviewed by Manager: Terry Seymour – Director of Infrastructure and Regulation
Department: Infrastructure and Regulation
Attachments: Uralla Treatment Plant Process Flow Diagram.

