Clutha District Council

Item for DECISION

Report	Lead Testing in Water Supplies
Meeting Date	18 February 2021
Item Number	4A
Prepared By	Thyagu Gopalan – Water & Waste Operations Manager
File Reference	510309

REPORT SUMMARY

This report provides the background information to the recent event of Lead (metal) detected in some Dunedin City Council (DCC) drinking water networks, historical water testing for Lead and other Priority 2 chemical determinands, risk management and the cost of testing for all the heavy metals including Lead.

RECOMMENDATIONS

1. **That Council receive the Lead Testing in Water Supplies report.**

2. **That Council approves:**

   a. **the commencement of a one-off surveillance round of testing for heavy metals in the raw water and reticulation of all District water supplies.**

      and

   b. **the commencement of a three-month programme of testing for heavy metals in the raw water and reticulation of Milton District water supplies.**

      or

   c. **that a decision on heavy metal testing of Clutha District water supplies is deferred for a short period until the outcome of the investigation into the North Otago lead detection is known and the advice regarding this to water suppliers has been updated.**

REPORT

1 Background

DCC have tested for metals in some networks and since August have been carrying out weekly network sampling for metals at 3 locations in Waikouaiti and Karitane. These have been indicating a variable picture - sustained background levels of lead (below the MAV) at one testing location and occasional spikes at others.

This sampling has also identified unexplained irregular high results of lead that after a wider sampling regime appear to be coming from the source water, a surface water catchment.

DCC have engaged Tonkin & Taylor to support the investigation into the source water, Otago Regional Council are now involved in this process.

In the Clutha District a proportion of the pipes in the Milton township have lead joints – these are the concrete pipes around the network that are progressively being replaced.

We have contacted our Drinking Water Assessor, Rosemarie Nelson, at Public Health South regarding the issue of lead testing and her reply is included below. At this stage she has confirmed that the risk assessment process in the guides should continue to be used. Ultimately, this is a decision for Council to make.

Hi Thyagu

I'd be surprised if the Waikouaiti water supply Pb Incident hasn't made water suppliers question the risks to their water supply.
In reply to your question, the P2 and P3 Guide should support the risk assessment that CDC carried out as part of their WSP process, as to whether lead (heavy metals) is a possible risk to the water supply. CDC should be proactively managing this risk if identified.
Notwithstanding, section 8, sub 8.2.1.4 of the DWSNZ refers is managing plumbosolvency.

Regards,
Rosemarie Nelson
Health Protection Officer/Drinking Water Assessor

PUBLIC HEALTH SOUTH I Southern DHB
Private Bag 1921, Dunedin 9054 I ***T:*** *(03)476-9800 I* ***DDI:*** *(03)476-9863 I* ***M****: (027)2233721*

2 Lead in the Water

"Lead (metal)" could be potentially introduced in the drinking water through,

- Naturally occurring Heavy Metals (Mineral deposits in the catchment)
- Plumbing materials that contain lead corrode, especially where the water has high acidity or low mineral content that corrodes pipes and fixtures.

This is required to be managed and risk assessed under Drinking Water Standards New Zealand 2005 (Revised 2018) regulations chemical compliance criteria.

3 CDC Historical Water Testing for Lead and other P2 Chemical Determinands

Water Safety Plans have not identified "Lead" as a high risk in our catchments and it has never been assigned as a priority 2 chemical determinand. So far Disinfection by-products and Fluoride have been assigned as Priority 2 chemicals determinands in some of our supplies and have been regularly monitored.

However, in the past some catchments have been tested for the Lead as tabulated below:

Source	Date of Testing	Testing Result (mg/L)	Maximum acceptable Value (mg/L)
Lawrence	18 July 2008	<0.00011	0.01
Clydevale bore	26 August 2020	<0.00011	

Clydevale bore (aquifer) has been tested for heavy metals during the recent Greenfield bore investigation (i.e. sampled from the test bore near the existing bore) and all the heavy metals are well below the maximum allowable limit.

Source	Tested Metals	Testing Result (mg/L)	Maximum acceptable Value (mg/L)
Clydevale Bore	Total Arsenic	<0.0011	0.01
Clydevale Bore	Total Cadmium	<0.000053	0.004
Clydevale Bore	Total Chromium	<0.00053	0.05
Clydevale Bore	Total Copper	<0.00053	2
Clydevale Bore	Total Lead	<0.00011	0.01
Clydevale Bore	Total Nickel	<0.0003	0.08
Clydevale Bore	Total Barium	0.0107	0.7
Clydevale Bore	Total Manganese	<0.00053	0.4
Clydevale Bore	Total Mercury	<0.00008	0.007
Clydevale Bore	Total Selenium	<0.0011	0.01

4 Risk Management - Catchment

Though heavy metal deposits have not been identified in any of the CDC water supply catchments, after the incident at DCC, worst case scenarios have been considered to assess the risk using the Priority 2 and 3 chemical identification guides. The following decision guide has been used in order to assess the need to test for heavy metals (incl. Lead).

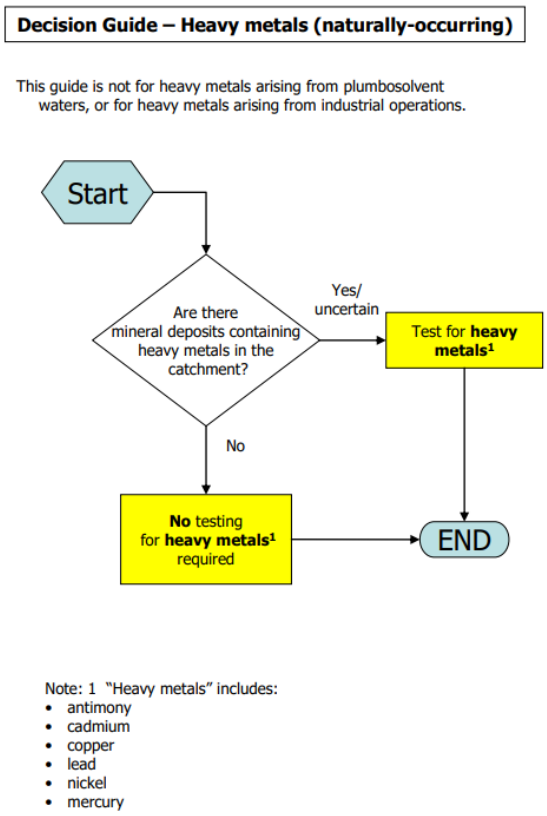

Figure 1: Decision guide for Heavy Metals Testing

One option is to confirm that we have not identified heavy metal deposits in any of our CDC water supply catchments. From a catchment perspective we would not then test. The alternative option would be to consider the catchment as "uncertain" (a worst-case scenario), and therefore test for heavy metals in the raw water sources. If we did test across the catchment it would then serve to shift the decision point from uncertain to certain for several years moving forward. For that reason, it is suggested that a one-off surveillance test of the catchment be conducted at an estimated price of $6,000 +GST.

5 Risk Management - Reticulation

Many of our waters are soft, with moderate to low levels of alkalinity and pH (exception is Owaka). These properties can give the water a high solvation potential, so the water may dissolve metals from fittings if it lies in the plumbing, for example, overnight. As per Drinking Water Standards New Zealand Standards 2005 (Revised 2018), this is called plumbosolvent water and assigned as priority 2c chemical determinands.

The risk is currently being managed as per Drinking Water Standards New Zealand Criteria 8.2.1.4 Option A, by providing the plumbosolvency notices through rates bill and public notices. *It recommends flushing a cup-full of water from your drinking-water tap each morning before use to remove any metals that may have dissolved from the plumbing fittings. We are recommending this simple precaution for all households, including those on public and private water supplies.*

With the information now known about the DCC incident, the programme to replace lead-jointed concrete pipes in Milton has a higher risk and should require a testing regime

over a three-month period. This would be a Staff recommendation at an estimated cost of $7,200 +GST.

6 Cost of Testing

A quote has been obtained (as attached) for the sampling and analysis of all heavy metals to assess the risk in the source water against drinking water priority 2 chemical determinands requirement limits. The heavy metals to be tested are Antimony, Arsenic, Lead, Barium, Cadmium, Chromium, Copper, Mercury, Selenium, Manganese, Nickel.

Total cost of testing of 15 source and 15 reticulation water samples is $6,000+GST. A three-month programme of weekly testing of both raw water and reticulation samples will be about $72,000+GST for 12 weeks of sampling, for Milton as a stand-alone it would be $7,200 plus GST.

The other option would be to wait for update guidance from the Ministry of Health once the investigation and likely source of the issues in North Otago have been identified. It is expected that the testing regime and risk assessment process through the Drinking Water Standards will be updated based on this investigation.

7 References

Drinking Water Standards New Zealand 2005 (2018)
https://www.health.govt.nz/system/files/documents/publications/dwsnz-2005-revised-mar2019.pdf

Priority 2 and Priority 3 Chemical Determinands Identification Guide

https://www.esr.cri.nz/assets/24.pdf

8 Attachments

Eurofins quote dated 15 February 2021.

eurofins | ELS

QUOTE

Eurofins ELS Limited

City Care Clutha - Potable Project
PO Box 2531
26 Crown Street
BALCLUTHA 9230

85 Port Road
Seaview
Lower Hutt 5045
New Zealand
Ph: (04) 576 5016, Fax: (04) 576 5017

Quote Number: 10265
Date: 15/02/2021
Account Code: D0210

Attention: Kerrod Baldwin

Notes: Sampling charge per hour as quoted

Test Code	Description	Detection Limit	Quantity	Fee	Price
DC-1204 *City Care Clutha Sampling Charge*	Sampling / Inspection 60 Mins		1	85.00	85.00
CDC Metals	CDC raw water metals				
6602 *ICP-MS following APHA Online Edition method 3125 (modified)*	Antimony - Total	0.002g/m³	15	0.00	0.00
6603 *ICP-MS following APHA Online Edition method 3125 (modified)*	Arsenic - Total	0.002g/m³	15	0.00	0.00
6604 *ICP-MS following APHA Online Edition method 3125 (modified)*	Barium - Total	0.005g/m³	15	0.00	0.00
6608 *ICP-MS following APHA Online Edition method 3125 (modified)*	Cadmium - Total	0.001g/m³	15	0.00	0.00
6611 *ICP-MS following APHA Online Edition method 3125 (modified)*	Chromium - Total	0.001g/m³	15	0.00	0.00
6613 *ICP-MS following APHA Online Edition method 3125 (modified)*	Copper - Total	0.002g/m³	15	0.00	0.00
6618 *ICP-MS following APHA Online Edition method 3125 (modified)*	Lead - Total	0.001g/m³	15	0.00	0.00
6621 *ICP-MS following APHA Online Edition method 3125 (modified)*	Manganese - Total	0.001g/m³	15	0.00	0.00
6622 *ICP-MS following APHA Online Edition method 3125 (modified)*	Mercury - Total	0.001g/m³	15	20.00	300.00
6624 *ICP-MS following APHA Online Edition method 3125 (modified)*	Nickel - Total	0.001g/m³	15	0.00	0.00
6702 *ICP-MS following APHA Online Edition method 3125 (modified).*	Antimony - Dissolved	0.001g/m³	15	0.00	0.00
6703 *ICP-MS following APHA Online Edition method 3125 (modified).*	Arsenic - Dissolved	0.001g/m³	15	0.00	0.00
6704 *ICP-MS following APHA Online Edition method 3125 (modified)*	Barium - Dissolved	0.002g/m³	15	0.00	0.00
6708 *ICP-MS following APHA Online Edition method 3125 (modified).*	Cadmium - Dissolved	0.0002g/m³	15	0.00	0.00
6711 *ICP-MS following APHA Online Edition method 3125 (modified).*	Chromium - Dissolved	0.001g/m³	15	0.00	0.00
6713 *ICP-MS following APHA Online Edition method 3125 (modified).*	Copper - Dissolved	0.0005g/m³	15	0.00	0.00
6718 *ICP-MS following APHA Online Edition method 3125 (modified).*	Lead - Dissolved	0.0005g/m³	15	0.00	0.00

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6721	Manganese - Dissolved	0.0005g/m³	15	0.00	0.00
ICP-MS following APHA Online Edition method 3125 (modified).					
6722	Mercury - Dissolved	0.0005g/m³	15	20.00	300.00
ICP-MS following APHA Online Edition method 3125 (modified).					
6724	Nickel - Dissolved	0.0005g/m³	15	0.00	0.00
ICP-MS following APHA Online Edition method 3125 (modified).					
9403	ICP-MS - 3 Elements		15	25.00	375.00
Charge code used to group the cost of ICP-MS and ICP-OES tests.					
9408	ICP-MS - 8 Elements		15	50.00	750.00
Charge code used to group the cost of ICP-MS and ICP-OES tests.					
9409	ICP-MS - 9 Elements		15	55.00	825.00
Charge code used to group the cost of ICP-MS and ICP-OES tests.					
P1855	Aqueous Total Metal Digestion		15	12.00	180.00
Follows APHA Online Edition Method 3030E (modified) using nitric acid.					
P1859	Sample Filtration		15	9.50	142.50
Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.					

Testing Services	$	2957.50
Sundry Charges	$	0.00
GST	$	443.63
Total Quote	**$**	**3401.13**

Test Methodologies:

Description	Method	Detection Minimum	Collection
ICP-MS - 3 Elements	Charge code used to group the cost of ICP-MS and ICP-OES tests.	n/a	
ICP-MS - 8 Elements	Charge code used to group the cost of ICP-MS and ICP-OES tests.	n/a	
ICP-MS - 9 Elements	Charge code used to group the cost of ICP-MS and ICP-OES tests.	n/a	
Sampling / Inspection 60 Mins	City Care Clutha Sampling Charge	n/a	
Antimony - Total	ICP-MS following APHA Online Edition method 3125 (modified)	0.002 g/m³	Digested Metals - Contains Acid - Silver Border
Arsenic - Total	ICP-MS following APHA Online Edition method 3125 (modified)	0.002 g/m³	Digested Metals - Contains Acid - Silver Border
Barium - Total	ICP-MS following APHA Online Edition method 3125 (modified)	0.005 g/m³	Digested Metals - Contains Acid - Silver Border
Cadmium - Total	ICP-MS following APHA Online Edition method 3125 (modified)	0.001 g/m³	Digested Metals - Contains Acid - Silver Border
Chromium - Total	ICP-MS following APHA Online Edition method 3125 (modified)	0.001 g/m³	Digested Metals - Contains Acid - Silver Border
Copper - Total	ICP-MS following APHA Online Edition method 3125 (modified)	0.002 g/m³	Digested Metals - Contains Acid - Silver Border
Lead - Total	ICP-MS following APHA Online Edition method 3125 (modified)	0.001 g/m³	Digested Metals - Contains Acid - Silver Border
Manganese - Total	ICP-MS following APHA Online Edition method 3125 (modified)	0.001 g/m³	Digested Metals - Contains Acid - Silver Border
Mercury - Total	ICP-MS following APHA Online Edition method 3125 (modified)	0.001 g/m³	Digested Metals - Contains Acid - Silver Border
Nickel - Total	ICP-MS following APHA Online Edition method 3125 (modified)	0.001 g/m³	Digested Metals - Contains Acid - Silver Border
Antimony - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³	Dissolved Metals - Pink Border
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³	Dissolved Metals - Pink Border
Barium - Dissolved	ICP-MS following APHA Online Edition	0.002 g/m³	Dissolved Metals - Pink Border

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Description	Method	Detection Minimum	Collection
	method 3125 (modified)		
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³	Dissolved Metals - Pink Border
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³	Dissolved Metals - Pink Border
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³	Dissolved Metals - Pink Border
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³	Dissolved Metals - Pink Border
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³	Dissolved Metals - Pink Border
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³	Dissolved Metals - Pink Border
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³	Dissolved Metals - Pink Border
Aqueous Total Metal Digestion	Follows APHA Online Edition Method 3030E (modified) using nitric acid.	n/a	
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a	

Footer (Disclaimer)

Please reference this Quote at time of submitting Samples. This quotation is valid for 30 days only.

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