



Test results for nitrate in water in REMS communities: 2012-14; 2018-20; 2020-21, 2021-22 and 2022-23

The Remote Essential and Municipal Services (REMS) program currently maintains and upgrades water infrastructure in 137 remote Aboriginal communities. Groundwater is the water source for these communities. Groundwater can often contain chemical elements and compounds. One compound sometimes found is nitrate, usually as a result of the natural process of underground plant decay.

Elevated levels of nitrate in drinking water can present a health risk for some people. Most at risk are very young, bottle-fed infants under 3 months of age. The risk arises if water containing elevated level of nitrate is used to mix the baby formula. However, the WA Department of Health advises that to date, no illness has been attributed to drinking water with elevated levels of nitrate in Western Australia.

Our testing regime for 89 communities is as follows:

- monthly microbiological testing of reticulated (tap) water;
- six monthly chemical testing of reticulated water; and
- six monthly chemical and bacteriological testing of groundwater bores (untreated water).

In 44 very small communities we test chemical and physical indicators annually including for nitrate.

Of these 133 communities:

- none have a level of nitrate that is above the ADWG value for adults, children and infants more than three months old (100 mg/L).
- 22 have had a level of nitrate in drinking water that exceeds the Australian Drinking Water Guidelines (ADWG) value for infants less than three months old that are bottle-fed (50 mg/L). 111 communities are not affected. Of the 22 communities listed in this report, 12 communities have had elevated nitrate exceed 50 mg/L in the current reporting period (1 July 2022 to 30 June 2023).

Table 1 below shows the 16 communities where nitrate testing of reticulated water exceeded the level set for infants less than three months age (50 mg/L). The table shows the number of times this occurred. To avoid the risk of harm to these infants, free bottled water is supplied to households and the health clinic in these communities, for use in mixing baby formula for infants under 3 months of age.

Among these 16 communities, a new water treatment plant is being constructed at Kiwirrkurra to reduce nitrate, fluoride and uranium to a safe level and at Warburton the new plant has been constructed and brought into operation during early 2022.

Tables 2.1 and 2.2 shows six communities that have had elevated levels of nitrate and where a water treatment plant has been installed to remediate this. The water produced by these plants is below the ADWG value for infants less than three months old who are bottle-fed. In other words, the household tap water is safe for these infants.


In three communities listed in **Table 2.1** this potable water is available from any household tap and in three communities **Table 2.2** the potable water is available only from a dedicated and well-marked 'third pipe/third tap' in each household.

However, for extra assurance in these six communities, free bottled water is recommended and provided for bottle-fed infants less than three months old, because there is no redundancy (back-up) in the rare event that the water treatment plant was to have an outage.


Further information from the Department of Health about nitrate in water is available [here](#).

Table 1

Nitrate test results exceeding the ADWG level for infants less than three months old

			Chemical testing (number of test results above ADWG levels)					
KEY GOLD: Goldfields KIMB: Kimberley PILB: Pilbara MIDW: Mid-West			 Nitrate (50 mg/L)					
Region	Community	Community Size ¹	1 July 2012 to 30 June 2014	1 July 2018 to 30 June 2020	1 July 2020 to 30 June 2021	1 July 2021 to 30 June 2022	1 July 2022 to 30 June 2023	Comment
GOLD	Blackstone	Large	19	9	2			Bottled water provided for bottle-fed infants less than three months old. Water suitable for all other infants and persons. Nitrate level is controlled via bore management.
GOLD	Mulga Queen	Small	1	14	11	11	12	Bottled water provided for bottle-fed infants less than three months old. Water suitable for all other infants and persons.
GOLD	Tjirrkarli	Small		2			1	Bottled water provided for bottle-fed infants less than three months old. Water suitable for all other infants and persons. Elevated nitrate of 54 mg/L was detected in reticulated sample taken from Tjirrkarli on 9 March 2023. The same water sample was sent to another laboratory and the nitrate level reported was 44 mg/L. Another water reticulated sample was collected on 16 March 2023 and the nitrate level reported was 20 mg/L.
GOLD	Tjukurla	Small		3	9	7	1	Bottled water provided for bottle-fed infants less than three months old. Water suitable for all other infants and persons.
GOLD	Wanarn	Large	6	21	12	12	12	Bottled water provided for bottle-fed infants less than three months old. Water suitable for all other infants and persons.
GOLD	Warburton	Large	8	24	12	9	6	New \$3m reverse osmosis water treatment plant being brought into operation during early 2022 to reduce nitrate levels. The reverse osmosis unit is in operation, elevated nitrate levels detected in 2022-23 FY were due to high community water consumption, resulting in high blending ratio. Investigation is in progress to resolve the issue.
GOLD	Wingellina	Large	5	20	12	12	12	Bottled water provided for bottle-fed infants less than three months old. Water suitable for all other infants and persons.

¹ Community Size: "Very small" means less than five houses; or less than 30 people; or not permanently occupied.
"Small" means between 5 and 39 houses (indicative population estimate of 30 to 199 people).
"Large" means between 40 and 200 houses (indicative population estimate of more than 200 people).

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KIMB	Mulan	Large	1	1				Bottled water provided for bottle-fed infants less than three months old. Water suitable for all other infants and persons. Nitrate level is controlled via bore management. One sample missed in the 2022-23 annual period.
KIMB	Pandanus Park	Small	19	26	13	12	11	Bottled water provided for bottle-fed infants less than three months old. Water suitable for all other infants and persons. One sample missed in the 2022-23 annual period. There is a standalone reverse osmosis at Pandanus Park that the treated water can be collected from a tap located outside the treatment unit container. The treated water is not a reticulated water supply that deliver the treated water to the households taps. The results shown in this table is for the reticulated water supply only.
PILB	Kiwirrkurra	Small	N/A	4	2	5	5	Water treatment plant under construction to remediate elevated level of uranium and fluoride and elevated level of nitrate for bottle-fed infants less than three months age. Bottled water provided for all persons including infants due to elevated fluoride level.
PILB	Kunawarritji	Small	20	22	12	12	12	Bottled water provided for bottle-fed infants less than three months old. Water suitable for all other infants and persons.
PILB	Wandanooka (Kardaloo)	V small			1	1		Bottled water provided for bottle-fed infants less than three months old. Water suitable for all other infants and persons.
MIDW	Burringurrah	Large	26	23	11	11	12	Bottled water provided for bottle-fed infants less than three months old. Bottled water provided for all persons from February 2022 due to additional elevated level of uranium.
MIDW	Kutkabubba	V small	26	23	11	12	12	Bottled water provided for bottle-fed infants less than three months old. Water suitable for all other infants and persons.
MIDW	Pia Wadjari	Small				1		Nitrate levels are below the infant health limit 50 mg/L in the 2022-23 annual period. Tap water is



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								unsuitable for all persons due to elevated uranium levels. Bottled water provided for all persons from May 2021, on advice from Department of Health, due to elevated uranium level.
MIDW	Yulga Jinna	Small	1	4	7	5	3	Bottled water provided for bottle-fed infants less than three months old. Water suitable for all other infants and persons.

Table 2.1

Communities where nitrate test levels are safe but bottled water still used for infants

There are three communities for which drinking water (from any household tap) is below the ADWG threshold for infants less than three months old. However bottled water is recommended and provided due to the unavailability of N-1 redundancy (back-up) in the rare event the water treatment plant has an outage. Outages can be caused by events such as a loss of power.


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GOLD	Cosmo Newberry	Small	20	1			1	Water from treatment plant is suitable for infants less than three months old but bottled water is recommended and provided. Elevated nitrate detected on 14 July 2022 because the reverse osmosis unit was offline between 12-14 July 2022.
GOLD	Jameson	Large	21	29	1	2		Water from treatment plant is suitable for infants less than three months old but bottled water is recommended and provided. A single instance of 58 mg/L was detected during April 2021.
PILB	Jigalong	Large	24					Water from treatment plant is suitable for infants less than three months old but bottled water is recommended and provided.

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Table 2.2

Communities where nitrate test levels are safe but bottled water still used for infants

There are three communities for which potable water from a ‘third-pipe, third-tap’ household supply is below the ADWG threshold for infants less than three months old. However bottled water is recommended and provided due to the unavailability of N-1 redundancy (back-up) in the rare event the water treatment plant has an outage. Outages can be caused by events such as a loss of power.

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		Nitrate (50 mg/L)									
Region	Community	Community Size ³	1 July 2012 to 30 June 2014	1 July 2018 to 30 June 2020	Potable water 1 July 2020 to 30 June 2021	Non potable water 1 July 2020 to 30 June 2021	Potable water 1 July 2021 to 30 June 2022	Non potable water 1 July 2021 to 30 June 2022	Potable water 1 July 2022 to 30 June 2023	Non potable water 1 July 2022 to 30 June 2023	Comment
GOLD	Mt Margaret	Small	19	25		12	2	12		12	Potable water from treatment plant (via household third pipe/third tap) is suitable for infants less than three months old but bottled water is recommended and provided. Nitrate level in the retic was elevated due to issue with the old/fouled membrane in November and December 2021.
GOLD	Patjarr	Small	26	22		12		11		12	Potable water from treatment plant (via household third pipe/third tap) is suitable for infants less than three months old but bottled water is recommended and provided.
GOLD	Tjuntjuntjarra	Small	6	2				3		2	

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